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Books, and Minerals.
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Philadelphia, Pa.

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PROCEEDINGS

OF THE

ACADEMY OF NATURAL SCIENCES

OF

PHILADELPHIA.

1873.

PUBLICATION COMMITTEE.

JOSEPH LEIDY, M.D., GEO. W. TRYON, JR.,
WM. S. VAUX, EDW. J. NOLAN, M.D.,
W. S. W. RUSCHENBERGER, M.D.

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HALL OF THE ACADEMY OF NATURAL SCIENCES,
PHILADELPHIA, February, 1874.

I hereby certify that printed copies of the Proceedings for 1873 have been presented at the meetings of the Academy, as follows:—

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"	89 to 104	"	25, 1873.
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"	153 to 200	"	8, 1873.
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"	249 to 264	"	17, 1873.
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"	297 to 328	September	23, 1873.
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"	345 to 360	October	28, 1873.
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SAMUEL B. HOWELL, M.D.,
Recording Secretary.

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PROCEEDINGS

OF THE

ACADEMY OF NATURAL SCIENCES

OF

PHILADELPHIA.

1873.

JANUARY 7, 1873.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-nine members present.

Trautwineite, a New Mineral.—By E. GOLDSMITH. A mineral on chromite, from California, was given to me for examination by Mr. Trautwine, who requested me to ascertain whether it was chrome-green. The mineral has a green color; the hardness is between 1 and 2. With the naked eye the material appears to be amorphous, but, observed under high power, it proves to be crystallized; it is therefore microcrystalline. The regular forms, which I saw, were short hexagonal pyramids, the infinite pyramid (prism), and triangular slender prisms, which may be one-sixth sections of the hexagonal prism; I presume that this latter form is sometimes called microlitic. When the substance is moistened on a glass slip, covered and placed between the two crossed nicol prisms, light is transmitted, with the usual phenomena of coloration. In regard to colors, I may note here, that the infinite pyramid shows by transmitted light a red color, but by reflected light it is green.

Under ordinary circumstances the mineral is dull, but when observed under power it appears vitreous. The streak is light green.

Pyrochemical tests: In the glass tube, closed on one end, when heated to redness it shows a little water, and turns bluish-green.

In borax, also in microcosmic salt, the material dissolves entirely

when heated long enough. The glass beads are green after cooling, having been subjected to the oxidizing or the reduction fire.

Carbonate of soda dissolves it, forming a yellow mass in the oxidizing, and a green one in the reduction flame. In acids the substance is not soluble, except some iron with which it is contaminated.

The further qualitative chemical examination indicated the oxides of chromium, iron, and magnesium.

For want of means the quantitative determination of those elements was not undertaken, but reserved for some future time.

The mineral known under the name of chrome-ochre must not be confounded with the above, for chrome-ochre is described to be a silicate of alumina, tinged with the sesquioxide of chromium. We are also told that it is amorphous, and its occurrence on porphyry near Halle, and near Waldenburg in Silesia, or on a conglomerate, as near Creuzot in France, shows I think sufficient differences not to consider it to be identical with the California mineral on the chromite. My impression is, that the mineral described is a new species, and if so, I would propose to name it in honor of Mr. John C. Trautwine, the first observer, *Trautwineite.*

Prof. COPE remarked, that, through the kindness of Prof. B. F. Mudge, he had an opportunity of examining additional specimens of the turtle from the cretaceous of Kansas, described by him in the Proceedings of the Academy 1872 p. 129. The phalanges indicated a large flipper of the type of marine turtles. They are more flattened than in the *Propluridæ* so far as the latter are known, and are proportionally larger. The genus and species were named *Toxochelys latiremis.*

JANUARY 14.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following papers were offered for publication:—

"Materials for the study of the Phytophaga of the United States." By G. R. Crotch, M.A. "Notes on the species of Buprestidæ of the United States." By G. R. Crotch, M.A.

Prof. COPE made some observations on the structure and systematic position of the genus *Eobasileus* Cope. *Uintatherium* Leidy and *Dinoceras* Marsh were names applied to allied Mammals, so that the same would probably apply to them also. They had both been originally referred to the *Perissodactyla*, by their describers, and subsequently Marsh had stated (Am. Journ. Sci. Arts, July 18, 1872) that the species described by him

(*Titanotherium ?anceps*) is a Proboscidian, without giving any reasons therefor. The speaker, in describing the genus *Eobasileus* (Proc. Amer. Philos. Society, August 20, 1872) referred it to the Proboscidia, giving as reasons the structure of the bones of the leg and foot, and of the posterior part of the skull. Prof. Marsh (l. c. Aug. 24) refers his species again to the *Proboscidia*, stating as a reason, "that the limbs resemble those of *Mastodon*," and he refers it to a genus *Tinoceras*, without description. Later (l. c. Sept. 27, 1872), Prof. Marsh refers these animals to a new order, *Dinoceria* (*?Dinocerata*), withdrawing them from the *Proboscidia*. Lastly, he stated, at a meeting of the American Philosophical Society, Dec. 20, 1872), that this order differs from *Proboscidia* in the presence of canine teeth and horns, and the absence of incisors.

Until further evidence is presented, I adhere to my original position, that these animals are true *Proboscidia*, and cannot be referred to any other order. The reasons are as follows:—

1. The malar bone is rod-like, and forms the middle element of the zygomatic arch.
2. The cervical vertebræ are exceedingly short and transverse.
3. In the distally expanded ulna supporting much of the carpus, and the slender radius crossing it to the outer side.
4. The femur is without third trochanter.
5. Its condyles are contracted, and the narrow intercondylar fissure is prolonged far forwards.
6. The spine of the tibia is wanting, and the glenoid cavities separated by a longitudinal keel.
7. The astragalus is not hour-glass shaped above, but with a uniform face.
8. The short plantigrade calcaneum.
9. The phalanges are short and stout, and represent several toes.

To these may be added three external characters which directly result from the osteological, viz.:—

10. The possession of a proboscis. This is proven by the very short cervical vertebræ, and by the fact that the nasal and premaxillary bones are deeply excavated at their extremities, with surrounding osseous eminences, for the origin of the muscles of the trunk, and by the extreme stoutness of the nasal bones.
11. The extension of the femur below the body, so that the leg was extended with the knee below and free from the body, as in elephants, monkeys, and men.
12. The short plantigrade foot, so different from that seen in other divisions of *Ungulata*.

Other characters, common to *Proboscidia* and some other ungulates, are:—

13. The scapula acuminate in outline above the spine, with a very short coracoid.
14. Broad truncate occiput with widely separated temporal fossæ.
15. The greatly expanded iliac bones.

The dentition is not far removed from that of *Dinotherium*. The presence of canine teeth might not prove a ground of distinction between *Elephantidæ* and *Eobasileus*, since in both types the tusk is embraced by both the premaxillary and maxillary bones. It thus becomes exceedingly probable that the tusk of *Mastodon* and Elephant, regarded as an incisor by Cuvier, is really a canine. But should a real peculiarity exist in this point, as does in the presence of horns, the two cannot distinguish the family from this order. Such range of variation is well known to exist in the *Artiodactyla*, where some *Cervidæ* and *Antelopidæ* are horned and some not; and where musk-deer have canines and *Bovidæ* none; or where the omnivorous section have canines and lack horns, while *Bovidæ* have horns and lack canines.

The peculiar physiognomy of the Elephants is, as is well known, produced by the enormous development of the frontal sinuses. In *Dinotherium* this structure is greatly reduced, and in *Eobasileus* exists chiefly in the squamosal region. The physiognomy of the latter is also materially affected by the great prolongation forwards of the nasal bones, which support horns or processes at both extremities, and by the narrowing of the snout, producing a somewhat pig-like expression. The palatal surface of the mouth is thus greatly elongate and narrowed, and must have accommodated a very slender tongue. These modifications are but subordinate, and such as we find in different members of the same order.

On the Forms of Artificial Oxide of Zinc. By GEORGE A. KOENIG, Ph.D.—The specimen under examination is a piece of brick taken from a zinc furnace of Lasalle, Ill. It is a gift of Mr. Hegler, proprietor of the works, to C. E. Richter, M. E., from whom I obtained it. I am not aware that any description of its occurrence has been published, and am confirmed in this belief by the fact that it was given to Mr. Richter as a curious but unknown substance.

The surface of the brick is covered by a dirty greenish coating, the nature of which could not be ascertained on account of its extreme thinness. A part of the surface, about one inch square, is covered by a cluster of long hair-like needles of a brilliant white color and glassy lustre. These needles are very nearly posed parallel to each other and to the face of the brick, presenting somewhat the appearance as if part of a goat's beard had been cut off and put on the stone. A number of cavities in the brick contain these needles also, but here they are placed transversely like many minerals, for instance millerite.

In order not to spoil the specimen, I took only 0.1 gramme for analysis, and in this quantity could not obtain any other reaction but on zinc. This metal was first precipitated by ammoniac sulphide, then redissolved and precipitated by sodic carbonate. It weighed, after ignition, 0.095 gramme. This result leaves no doubt of the truth of the assertion, that the substance examined is pure oxide of zinc.

Placed under the microscope, with a magnifying power of 250 diameters, the needles present a purely prismatical habitus. Moreover, it seems apparent from the form of the basal termination, that the prisms belong to the hexagonal system.

The natural oxide of zinc, the zincite or red zinc ore, has not been found yet in well-defined crystals; but the massive specimens of Sparta, Franklin and Stirling, N. J., show a distinct cleavage after a hexagonal prism and after the hexagonal basis. Thus, the identity of form in the natural oxide of zinc and in the artificial oxide, would seem to be existing.

On a Boiler Incrustation from New Jersey. By GEORGE A. KOENIG, Ph.D.—Some time ago Mr. Joseph Harrison, Jr., presented to the Academy a specimen of boiler incrustation from Orange Co., N. J. The physical properties of this incrustation were remarkable enough to suggest a chemical examination. It was about half an inch thick, presented a smooth surface, was hard and coherent, of a brownish-flesh-color, and showed on the fracture a distinct prismatic structure, the prisms standing vertically on the surface. It looked very much like the so-called "Sprudelstein" from Karlsbad in Bohemia, which is aragonite.

The analysis gave the following results:—

Sulphuric acid (SO_3)	=	57.58
Calcic oxide (CaO)	=	40.40
Ferric oxide (Fe_2O_3)	=	0.54
Silicic acid (SiO_3)	=	0.05
Organic substance and water	=	1.00
		99.57

57.58 parts of sulphuric acid require, by theory, 40.306 parts of calcic oxide to form calcic sulphate, which latter number corresponds perfectly with the one found; we can say, hence, that the incrustation is composed of—

Calcic sulphate	=	97.89
Ferric hydrate	=	0.72
Silica		0.05
Organic matter		0.82

To my knowledge there has not been described, so far, a boiler

incrustation which is so very near chemically pure calcic sulphate, and none in which this is so perfectly anhydrous. We know that calcic sulphate occurs in nature in two forms. In one it is combined with two equivalents of water, viz.:—

Calcic sulphate	= 79.07
Water	= 20.93

crystallizing in oblique rhombic prisms, and is called gypsum. Then it is found without water, crystallized in orthorhombic prisms, and is named anhydrite.

We know further that gypsum begins to lose water not much above the boiling point of water, and can be rendered anhydrous by prolonged heating at about 200° centigrade. Still it seemed of interest to ascertain what changes would take place in a saturated solution of gypsum when evaporated under the atmospheric pressure at the boiling point, and also under a higher pressure.

A saturated solution of gypsum was kept at the boiling point until an ample amount of precipitate had formed. This precipitate consisted of minute scales with a marked silky lustre. Under a magnifying power of 60 diameters the scales proved to possess the characteristic tabular forms of gypsum with the oblique basis. They were perfectly transparent, and many were twins, those swallow-tail shaped forms so well known.

Upon ignition 20.7 per cent. of water was found instead of 20.93, as required by the formula.

A saturated solution of gypsum was now sealed up into a glass tube, and kept in an oil bath for fourteen hours at a temperature of 148° centigrade. This temperature is equal to a pressure of 4.4 atmospheres, or 66 pounds to the square inch.

A slight granular precipitate was found on the glass after removing the tube from the bath and drawing off the mother liquor. Under a magnifying power of 120 diameters the apparent granules dissolved into stellate groups of needle-shaped crystals intermixed with single needles of a larger size. Most of the crystals had the oblique rhombic basal termination of gypsum; but some showed an orthorhombic basis. All the crystals had become opaque, apparently by innumerable fissures, as a network could be discerned in many individuals. The presence of prismatic protuberances on some of the crystals standing at right angles to the principal axis of the main crystal seemed very curious.

The precipitate was now removed from the tube and carefully washed, then dried over sulphuric acid. After ignition a loss was produced of 3.1 per cent. Taking into consideration that not all of the mother liquor was washed out and crystallized as gypsum, this result may be looked upon as confirmatory that the whole of the precipitate is anhydrite. Professor Genth is of opinion that the opaque stellate crystals are pseudomorphs of anhydrite after gypsum, and there does not seem at present any reason to the contrary.

In nature we find the anhydrite associated with rock salt. Supposing that the deposition of the chlorides of sodium and potassium took place under a moderately high column of saturated water, the pressure exercised by this column would give a satisfactory explanation for the fact that calcic sulphate crystallized as anhydrite. The presence of gypsum in the same deposits would suggest a subsequent metamorphosis of the anhydrite into gypsum by taking up water.

JANUARY 21.

Dr. BRIDGES in the chair.

Twenty members present.

Notice of Fossil Vertebrates from the Miocene of Virginia.— Prof. LEIDY directed attention to some fossils, part of a small collection recently received. They were found imbedded in blue clay containing an abundance of fossil diatomes, among which Coscinodiscus is especially conspicuous. The fossil vertebrate remains consist mainly of vertebræ and teeth of cetaceans, vertebræ of bony fishes, teeth of sharks, and spines of rays. Among them also there is a portion of a humerus of a bird, and several worn teeth of a peccary. Besides these there are specimens which may be regarded as characteristic of the following undescribed species.

PROTOCAMELUS VIRGINIENSIS. Represented by the lower last premolar, and the first and last molars of an animal about the size of the existing Lama, and intermediate in size to *Protocamelus occidentalis* and *P. gracilis* of the tertiary of the Niobrara River, Nebraska.

TAUTOGA (PROTAUTOGA) CONIDENS. Represented by a premaxillary with teeth, and portion of another with the first tooth. The specimens indicate a much larger species than the living Black Fish *Tautoga*. The bones and relative position of the teeth exhibit some peculiarities. The premaxillary externally is flatter than in the Black Fish, and it appears as if it did not turn down in a hook-like end at its outer extremity. The teeth also are separated by comparatively wide intervals, independently of the interspaces provided for successional teeth. The form of the teeth is the same as in the Black Fish. One of the specimens contains the base of the first large tooth and a row behind of seven other teeth. The other specimen contains the first large tooth, which is nearly half an inch in length, but proportionately more robust than in the Black Fish.

ACIPENSER ORNATUS. Founded on a dorso-lateral plate indicating an extinct species of sturgeon of medium size. The length or height of the plate is about $2\frac{1}{2}$ inches; its breadth along the crest is an inch and three-fourths.

Mr. THOMAS MEEHAN said he had the pleasure of offering to the Academy some facts in regard to the fertilization of flowers which confirmed the popular view that pollen of one variety had an immediate influence on the structure of the fruit of another variety, as well as on the progeny; and also he thought furnishing some entirely new facts in regard to the ability of a seed germ to receive impregnation from two distinct sources. He had presented to the Academy last year fruit gathered from a pear tree, which the members would remember had the regular seeds and carpels of a pear, but the flesh was fibrous and not granular as in the pear, and the external membranes or rind was that of an apple. An apple tree had its branches interwoven with that of the pear, and it had been assumed that the pollen of the apple had so influenced the fruit of the pear as to produce an immediate effect in the way presented.

But it had been urged in some quarters that this assumption was open to objection. It was now fully proved that changes of form occurred through what is now known as *bud variations* and independent of any seminal action; and it was contended this might have been the case in the pear-apple referred to. That there are these changes is well known. The peach is believed to be a development of this character from the almond—at any rate the nectarine is positively known to have sprung from a bud—not from a seed of the peach. But in case it might still be argued that in some way there was a latent germinal influence in the cells of plants the results of cross breeding many generations past; in other words, that the new appearance was simply a reversion and not a new creation, there had been some evidence in regard to the sweet potato offered to the Academy a few years ago, proving bud variation quite independent of any supposed reversionary character derived from seminal influence. There are no closely allied species to the sweet potatoes grown. Moreover it does not flower in these northern regions; yet root stocks had been exhibited here with tubers of two varieties distinct in color, form, and other characters growing on the same plant.

But the gentleman who sent the apples to the Academy, Mr. Arnold of Paris, Canada, determined to observe the effect of cross fertilization on Indian corn. He procured a very peculiar variety of which Mr. Meehan exhibited an ear, not known in the vicinity—a brown variety, with a circular dent at the apex—and raised one plant from it. The first set of flowers were permitted to be fertilized by their own pollen in order to test whether there was any reversionary tendency in the plant, or the pollen of any other variety in the vicinity. The ear now produced was the result—every grain being like its parent. The corn plant produces two ears on each stalk. As soon as the "silk"—the pistils of this second ear—appeared, the pollen—in a "tassel"—of the common yellow flint corn was procured, set in a bottle of water tied near the de-

veloping ear, the plant's own tassel having been cut away sometime previous. After a short time this set of male flowers was removed, and a panicle of male flowers from a white variety was introduced to the same bottle in order to afford it the opportunity of operating on the same female flowers. The result was the ear now presented. The base of *each grain* was of the yellow flint corn, but the *upper half* of the white variety.

Those who opposed the facts of evolution by continually cautioning its advocates against giving way to "imagination," and "brilliant speculations," he thought might be profitably benefited by their own suggestions. There was comparatively little to sustain the idea of reversion, but fancied resemblance—and this resemblance not the result of a comparison of two facts side by side; but a fact on one hand compared with memory, and often the distant and vague memory of another long in the past. At any rate, in these experiments of Mr. Arnold, there was the test applied to guard against any objection of either reversion or evolution, which, though not absolutely perfect, was as near so as the vast mass of human experience was; and the result was he thought no escape from the conclusion, not only that there was an immediate influence on the seed and the whole fruit structure by the application of strange pollen; but the still more important fact, hardly before more than suspected, that one ovule could receive and be affected by the pollen of two distinct parents, and this too after some time had elapsed between the first and second impregnation.

JANUARY 28.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following gentlemen were elected members: Charles Sinnickson, Chas. I. Yorke, Jr., John S. Sinnickson, M.D., Armon D. Trimble, and Howard N. Potts.

The following standing committees were elected for the year 1873:—

ANTHROPOLOGY.
J. Aitken Meigs,
Henry S. Schell,
J. F. Richardson.

COMPARATIVE ANATOMY.
Harrison Allen,
J. H. McQuillen,
Jos. Leidy,
Henry C. Chapman.

MAMMALOGY.
Harrison Allen,
Edw. D. Cope,
Henry C. Chapman,
U. C. Smith.

ORNITHOLOGY.
Bernard A. Hoopes,
Edwin Sheppard,
Theo. L. Harrison,
Jas. Ogden,
John Krider.

ICHTHYOLOGY.
Edw. D. Cope,
Thaddeus Norris,
J. H. Redfield.

HERPETOLOGY.
Edw. D. Cope,
Harrison Allen,
Samuel B. Howell.

ARTICULATA.
G. H. Horn,
R. S. Kenderdine,
T. Hale Streets.

RADIATA.
G. H. Horn,
J. G. Hunt,
R. S. Kenderdine,
S. B. Howell.

VERTEBRATE PALÆONTOLOGY.
Jos. Leidy,
Edw. D. Cope,
Harrison Allen.

INVERTEBRATE PALÆONTOLOGY.
T. A. Conrad,
H. C. Wood, Jr.,
Persifer Frazer, Jr.

BOTANY.
E. Durand,
Thos. Meehan,
Isaac Burk,
Rachel Bodley.

MINERALOGY.
Wm. S. Vaux,
E. Goldsmith,
Jos. Willcox,
Clarence S. Bement,
Persifer Frazer, Jr.

CHEMISTRY.
F. A. Genth,
Robert Bridges,
E. Goldsmith,
S. B. Howell.

PHYSICS.
R. E. Rogers,
J. G. Hunt,
Robert Bridges,
J. H. McQuillen,
Alex. Willcox.

INSTRUCTION AND LECTURES.
Hector Tyndale,
R. S. Kenderdine,
Wm. S. Halsey,
J. Aitken Meigs,
W. S. W. Ruschenberger.

LIBRARY.
Jos. Leidy,
Chas. F. Parker,
Geo. W. Tryon, Jr.,
W. S. W. Ruschenberger,
J. G. Richardson.

On report of the committees, the following papers were ordered to be printed.

MATERIALS FOR THE STUDY OF THE PHYTOPHAGA OF THE UNITED STATES.

BY G. R. CROTCH, M. A. CANTAB.

The following paper does not profess to be an exhaustive monograph upon this group; for such a work the time is not come, and the species here noticed will be nearly doubled if they are diligently collected and observed in different States. In particular, I would call attention to the *Halticini*, as being in almost a complete chaos. I have endeavored to diagnose the various genera, adding as few as possible at present, and to give tables, and often diagnoses of all the species; in some intricate genera, I have, however, abstained from remark. The immediate object of this publication is to make known the numerous unnamed species common in collections, in order that they may be inserted in the forthcoming check list of the Coleoptera of the United States, now printing at Salem. All the species described are from the cabinets of Drs. Leconte and Horn, without whose help and aid, this paper could not have been attempted.

CHRYSOMELIDÆ.

Form elongate, thorax not margined, head constricted behind.
- 1st ventral segment very long, claws simple. *Donaciides.*
- 1st ventral segment not longer than the rest.
  - Claws dentate, posterior coxæ nearly contiguous. *Orsodacnides.*
  - Claws simple, connate. *Criocerides.*

Form more or less rounded, thorax margined, head inserted.
- Antennæ distant.
  - Pygidium vertical, bare, last ventral segments connate.
    - Anterior coxæ prominent, contiguous. *Melolonthides.*
    - Anterior coxæ transverse, distant. *Cryptocephalides.*
  - Abdomen normal.
    - Anterior coxæ transverse, claws generally simple. *Chrysomelides.*
    - Anterior coxæ globose, claws bifid. *Eumolpides.*
- Antennæ approximate, anterior coxæ conical, prominent. *Galerucides.*

Form variable, antennæ approximate, inserted on the front.
- Head free, form elongate. *Hispides.*
- Head hidden under the thorax, elytra explanate. *Cassidides.*

DONACIIDES.

DONACIA, Fabr.

I. Anteror tibiæ simple, form elongate subtriangular, elytra truncate at the apex, upper surface flattened, femora often elongate, dentate.

Aa. 3d joint of antennæ much longer than the second—legs more or less pale.

Ba. Head, thorax, and scutellum pubescent.

Ca. Elytra rounded, femora simple, elytral interstices punctulate. *pubicollis.*

Cb. Elytra subtruncate, ♂ femora unidentate. *Harrisii.*

Bb. Above glabrous.

Ca. Thorax scarcely punctulate.

Da. ♂ posterior femora, 2–3-dentate, tibiæ serrate. *lucida.*

Db. ♂ posterior femora, 1-dentate, tibiæ simple.

Ea. ♀ posterior femora dentate.

Fa. Thorax with the anterior callus obsolete.

Ga. Elytra transversely regulose, ♂ anterior tarsi dilated. *palmata.*

Gb. Elytra smooth.

Ha. Elytra striate punctate, interstices convex. *hypoleuca.*

Hb. Elytra seriate punctate. *texana.*

Fb. Callus well marked, ♀ with last segment produced. *piscatrix.*

Eb. ♀ posterior femora simple, form of next section. *tuberculata.*

Cb. Thorax closely punctulate, subrugulose. *porosicollis.*

Ab. 3d joint of antennæ not, or hardly, longer than 2d, legs æneous.

Ba. Thorax and head pubescent. *hirticollis.*

Bb. Glabrous.

Ca. Posterior femora 2–3-dentate, tibiæ serrate.

Da. Thorax quadrate, antennal joints equal. *magnifica.*

Db. Thorax elongate, 3d joint visibly longer than 2d. *proxima.*

Cb. Posterior femora shorter, 1-dentate.

Da. Thorax with distinct callus, ♂ pygidium emarginate. *distincta.*

Db. Thorax closely punctate (tibiæ sometimes pale). *subtilis.*

II. Elytra subtruncate or rounded, convex, parallel; antennæ short; legs short, thick; anterior tibiæ with the apex produced into a tooth. (Plateumaris Th.)

Aa. Pubescent. *pubescens.*
Ab. Glabrous.
Ba. Elytra subtruncate, legs nearly black.
Ca. Elytra bi-impressed, thorax foveolate inside the callus. *confusa.*
Cb. Thorax nearly smooth. *torosa.*
Bb. Elytra rounded, scutellum pilose.
Ca. Thorax more or less rugulose, basal groove not defined.
Da. ♂ ♀ posterior femora dentate.
Ea. ♂ pygidium emarginate, legs black, thorax sparsely punctulate. *emarginata.*
Eb. Thorax rugulose, legs more or less red.
Fa. Antennæ with the 2d and 3d joints equal. *pyritosa.*
Fb. 3d distinctly longer than 2d. *cuprea.*
Db. ♀ femora simple.
Ea. Thorax rugulose, with smooth reliefs, legs red. *femoralis.*
Eb. Thorax with disk smooth, dorsal channel visible, legs nearly black. *metallica.*
Cb. Thorax convex, dorsal and basal grooves marked, legs red.
Da. Thorax less convex, rugulose. *flavipes.*
Db. Thorax convex, punctate. *jucunda.*
Dc. Thorax very sparingly punctate. *Kirbyi.*

For a full description of these species the reader is referred to Leconte's synopsis, in the Proceedings of the Academy for 1852. Several species therein described are here marked as varieties, possibly in some cases incorrectly; but I have included only those species that I could definitely tabulate out, and rejected all others. The synonymy thus introduced will stand thus: *D. rufescens* = *pulchella* = lucida; *D. congener* = *alutacea* = piscatrix; *D. confluens* = *fulgens* = subtilis; *D. aurifer* = *dives* = *pusilla* = cuprea; *D. gentilis* = metallica; *D. sulcicollis* = *D.* Kirbyi. I am unable to add anything about the doubtful species, of which types must be compared; of species described since, *D. Californica* = proxima, *D. junci* = emarginata, and *D. pubescens* will be found above.

D. pubicollis, sp. n.

Narrow, elongate æneous; legs pale-red, under surface silvery; head, thorax, and scutellum cinereous, pubescent; eyes prominent; thorax longer than broad, callus not well-marked, surface punctu-

late; elytra closely striate punctate, apex rounded, interstices rugulose; tibia carinate externally, apex not produced. L. .42. Illinois. Very distinctly the rounded elytra, simple femora, and pubescent thorax.

D. texana, sp. n.

Head and thorax narrow, elytra rather broad, triangular; beneath silvery, above dark-green; eyes prominent, head sulcate, bituberculate in front; thorax broader than long, alutaceous, hardly punctulate; elytra smooth, interstices flat, broad, the rows of punctures golden-green; legs and antennæ æneous, base of femora pale. L. .40. Texas.

The only other genus belonging to this sub-family is *Macroplea* (*Hæmonia*), readily recognized by the glabrous testaceous surface, and by its elytra produced into a spine at the apex. The only species is *H. Melsheimeri*, which lives in rivers clinging to aquatic plants, and may be found throughout the summer.

ORSODACHNIDES.

A. Anterior coxal cavities open, thorax with sides dentate. *Syneta.*
B. Coxal cavities closed.
  a. Eyes entire. *Orsodachna.*
  b. Eyes emarginate, thorax with a lateral tubercle. *Zeugophora.*

ORSODACHNA, Latr.

1. **O. atra** (Ahrens), N. Act. Hal., i. 3, p. 26, 27.

Elongate, thorax coarsely rugosely punctate, with several smooth places in relief; elytra coarsely, rather closely punctate; beneath finely punctate, and clothed with a short decumbent pubescence. L. .22–.26. Atlantic region.

This species is extremely variable, the thorax is black or red, and the elytra are black or ochreous, with the suture and margins black; the legs are red or black. From these varieties have been formed the *hepatica* and *vittata* of Say, the *bivittata* of Lacordaire, the *ruficollis* and *inconstans* of Newman, and the *armeniacæ* of Germar. Ahren's name is much older than any of these.

2. **O. Childreni**, Kirby, Faun., B. A., p. 221, 298, pl. 7, f. 6, *tibialis*, Kirby, l. c.

Closely allied to the preceding, similarly variable, but smaller, narrower, more shining; thorax sparsely not deeply punctate, elytra less strongly and less coarsely punctate normally, with

the margin narrowly, and a broad fascia behind the middle, black; under side as in O. atra. L. .21–.24. Canada, Hudson's Bay, Lake Superior.

Black varieties of this species also occur.

3. O. luctuosa, Lec., Mon. i. p. 72, 73.

Black, thorax red, with a very large spot black, tolerably narrowed behind, margins thickly, disk vaguely punctate, elytra closely punctate, finely transversely rugose. L. 3½ lin. Oregon (Reiche). This species I have not seen.

ZEUGOPHORA (Kunze), (TARAXIS, Lec.).

1. Z. scutellaris, Suffr. Lac., Mon. i. 236, 1.

Black, head, thorax, scutellum, legs, pro- and meso-sternum clear, testaceous yellow; antennæ with the first joint yellow, 2–3 yellowish; scarcely pubescent, coarsely punctate. L. .15. Illinois (Leconte).

2. Z. abnormis (Lec.), Lake Sup., p. 237.

Rather elongate, very sparsely pubescent, coarsely punctate; thorax with the lateral spine obtusely rounded, short, black; antennæ, parts of the mouth, and legs red; epipleuræ of thorax and elytra pitchy. L. .16. Lake Superior, Oregon. More elongate than the other species; fifth joint of antennæ larger than the sixth. A variety entirely rufous also occurs.

3. Z. puberula, sp. n.

Allied to *Z. scutellaris*, but with short antennæ and thickly pubescent surface; the lateral spine is well marked, triangular, the color is dark ferrugineous, the meta-sternum, abdomen, and joints, 5–11 of the antennæ being black. L. .14. Illinois (Leconte).

4. Z. varians, sp. n.

Very sparingly pubescent, shining; front of head antennæ, legs, and pro-sternum pale ferrugineous; thorax ferrugineous, spine obtuse, disk on each side with a broad black patch; elytra pitchy-black, with a common discoidal patch, and the sutural margin ferrugineous. L. .13. Illinois, Kansas, Pennsylvania.

5. Z. consanguinea, sp. n.

Very like *Z. varians*, but longer, more deeply colored, thorax entirely red, elytra entirely black. L. .14. Illinois. Easily distinguished by the elongate form.

SYNETA, Esch.

1. **S. ferruginea** (Germ.), Nov. Act. Hal., i. 6, p. 34; *rubicunda*, Lec. Mon., i. 230, 2 *tripla* Say, T. Acad., v. 391.

Elongate, entirely ferruginous; antennæ infuscate, base pale; elytra with four elevated lines, the third only visible at the apex, the second sharply costate; interstices deeply punctate. L..30–.32. Lake Superior, Middle, and Western States. To this belongs *S. costata* Newm.

2. **S. carinata** (Mannh.), Lec. Mon., i. 228, 1.

Larger than the preceding, more deeply punctate, all the elytral lines sharply costate, color brown. L..32–.38. Sitka, Vancouver, Oregon.

♂ Posterior tibia largely dilated at the apex, with a hamate process near the apex, of the length of the first joint of the tarsi.

3. **S. albida**, Lec., Pac. R. Rep. p. 66.

Pale ochreous, elytral lines hardly elevated, third indistinct. L. .30–.32. Vancouver, Oregon.

♂ Disk of thorax and suture of elytra black. (*Suturalis* Lec.) This includes *S. seriata* Lec. as a variety.

4. **S. simplex**, Lec., Pac. R. Rep., p. 66.

Only one female from Oregon; this is very near *S. ferruginea*, but the elevated lines are only visible at the base of the elytra.

CRIOCERIDES.

LEMA (Farr.) Lac.

A. Elytra with the ninth stria entire.
- Elytra unicolorous blue.
  - Thorax red.
    - Head bituberculate, red.
      - First joint of antennæ, abdomen, and legs red. *texana.*
      - Antennæ, abdomen, and legs black. *brunnicollis.*
    - Antennæ and tibiæ black, abdomen red. *cornutus.*
    - Head simple, thorax spotted with black. *maculicollis.*
    - Head simple, black, thorax short. *collaris.*
  - Thorax black. *peninsulæ.*
- Elytra more or less marked with testaceous.
  - Head black, elytra blue with testaceous fascia. *solani.*
  - Head red, elytra testaceous, suture and vitta black. *nigrovittata.*
    - Elytra blue, margin and basal spot testaceous. *conjuncta.*
    - Elytra testaceous, suture and marginal vitta black. *trilineata.*

B. Elytra with the ninth stria interrupted.

Elytra blue, thorax red.	*Sayi.*
Elytra red, spotted with black.	
Larger, spots discoidal.	*6-punctata.*
Smaller, spots common, sutural.	*albini.*

1. **L. cornuta** (Feb. 1801), Lec. Mon., i. p. 382.

Red, elytra blue, knees, tibiæ, tarsi, and antennæ black. L. .22. South Carolina, Leconte.

2. **L. texana**, sp. n.

Very near *L. cornuta*, but rather smaller; head much less strongly tuberculate; first joint of antennæ, scutellum, and legs entirely red. L. .21. Texas, not rare.

3. **L. brunnicollis**, Lec. Mon., i. p. 391.

Also near *L. cornuta*, but smaller and in proportion broader; antennæ, legs, and abdomen black. L. .18. Southern States.

4. **L. maculicollis**, Lec. Mon., i. p. 392.

Black, elytra blue; thorax red, elongate, subcylindrical, alutaceous, with two fuscous vittæ. L. .18. Southern States.

5. **L. collaris**, Say, J. Acad., iii. 430.

Black, thorax red, elytra black; head roughly sculptured in front; thorax short, hardly constricted, impunctate; elytra punctate, striate shining. L. .20. Texas.

Var. Elytra blue, thorax faintly punctate, more constricted. Illinois.

6. **L. peninsulæ**, sp. n.

Entirely polished black, elytra steel-blue; head deeply sculptured, front with an impressed V-like mark; thorax longer than broad, constricted obliquely behind the middle, disk sparingly punctate; elytra seriate punctate, interstices very sparsely punctulate. L. .22. Lower California (Leconte).

7. **L. solani** (Fab.), Lec. Mon., i. p. 400.

Red, metasternum, legs, antennæ, and head black; elytra blue; margin and a medial fascia red; interstices very sparingly punctulate. L. .25. Florida.

8. **L. conjuncta**, Lec. Mon., i. p. 405.

Red, antennæ (except the first joint), tibiæ, and tarsi black: elytra blue, margin and a small basal spot red. L. .24. Florida.

This probably has a less developed form.

9. **L. trilineata** (Oliv.), Lac. Mon., i. p. 40.

Red, antennæ (first joint excepted), tibiæ, and tarsi black; thorax with two black spots; elytra with the suture and a submarginal vitta black. L. .25. Atlantic region, Mexico.

Var. Elytral bands very narrow (*trivirgata*, Lec.).

Var. Elytral bands more or less confluent.

10. **L. nigrovittata** (Guér.), Lac. Mon., i. p. 421.

Closely allied to *L. trilineata*, but with the head and metasternum black; the legs are irregularly black and red; thorax with two lateral black spots. L. .25. Arizona, California.

11. **L. 6-punctata** (Oliv.), Lac. Mon., i. p. 486.

Ferruginous red, legs and antennæ black (base of femora and first joint of antennæ red); sides of metasternum black, elytra each with the humeral angle, a spot near the suture before the middle and another layer at 3–4 black. L. .24. Southern States.

Var. Spots confluent on the suture, humeral angles paler (*ephippiata*, Lac.). L. .20.

Var. Spots confluent on the suture (*albini*, Lac.).

12. **L. Sayi**, sp. n.

Ferrugineous red, antennæ and legs black; elytra blue; head with a small black fovea on the vertex; thorax elongate, rather sharply constricted, thickly punctulate, disk black; elytra punctate striate, 9th stria narrowly interrupted; femora clavate, pubescent. L. .24. Southern States.

L. melanocephala, Say (J. Acad., v. 294), has not yet been identified; the head and abdomen are black, thorax and elytra testaceous red.

L. signaticornis, Chev. (*intermedia*, Guér.) is given in the Melsheimer Catalogue, and is common in Mexico. It is rather like *trilineata*, but the antennæ are pale, with joints 6–8 black.

Crioceris asparagi (Linn.) has been introduced, and occurs in many parts of the United States, and may be readily known by its coloring; bluish-green, thorax red, with two green spots, elytra with four lateral yellow spots confluent with a yellow margin.

MELOLONTHIDES.

A. Tarsal claws simple.	
B. Anterior coxæ contiguous.	*Anomœa.*
Bb. Anterior coxæ separated by the prosternum.	
C. Elytra striate punctate.	*Euryscopa.*
Cb. Elytra irregularly punctate.	*Coscinoptera.*
Ao. Claws appendiculate.	
B. Anterior coxæ contiguous.	*Babia.*
Bb. Anterior coxæ separate.	
C. Elytra without epipleural lobes.	*Urodera.*
Cb. Elytra with large epipleural lobes.	*Saxinis.*

I have elsewhere exposed the reasons that induce me to adopt Geoffroy's name for the typical genus of this subfamily, which has at least twenty years of priority.

ANOMŒA, Lac.

1. **A. laticlavia** (Forst., 1771), Lac. Mon., ii. p. 132, 2.

Elongate, cylindrical, fulvous, obsoletely punctulate, subopaque; elytra and legs unicolorous or suffused with black. L. .30–.32. Middle and Southern States, Texas.

Lacordaire (l. c. p. 137) has separated *C. mutabilis* on some Texan and Mexican specimen with the thorax and a fascia across the elytra black; but I cannot see any structural differences.

2. **C. militaris**, Lec. Pr. Acad. 1858, 83.

Black, cylindric, pubescent beneath; thorax unequal, sparsely punctate; elytra blue-green, with a large triangular humeral, and a round subapical spot red, coarsely subseriate punctate. L. .18. Texas (Leconte). Allied to the *C. humerigera*, Lac., which, however, wants the apical spot.

BABIA, Chev.

1. **B. biguttata** (Oliv., 1790), Lac. Mon., ii. p. 428, 5.

Oblong, black, shining, elytra coarsely punctate striate, interstices coarsely and sparsely punctate, each with a humeral and subapical spot red. L. .14–.16. Southern States, Texas, Mexico.

B. pulla, Lac. (l. c. p. 429) is a variety with the thorax very finely punctulate.

B. tetraspilota, Lec. is a depauperated specimen from the Colorado desert.

Urodera, Lac.

1. **U. crucifera**, Lac. Mon., ii. p. 454, 6.

Cylindrical, polished, black, thickly clothed with white pubescence beneath; head and thorax impunctate; elytra fulvous; very lightly punctate striate, intervals smooth, with a sinuous medial fascia black, running along to the apex. L. .30. New Mexico, Arizona.

Saxinis, Lac.

1. **S. omogera**, Lac. Mon., ii. p. 482.

Cylindrical, short, blue-green, pubescent beneath; thorax coarsely and rather closely punctate: elytra with a humeral spot red, strongly and confusedly punctate striate, interstices very sparingly punctate. L. .10–.14. Texas, Southern States.

2. **S. saucia**, Lec. Pac. R. Rep. p. 66.

Much larger than *S. omogera*, elytra confusedly rugulose, thorax very sparingly punctate, shining. L. .26–.30.

This is evidently the *Clythra bisignata*, Walk.

Eurycopa, Lac.

1. **E. Lecontii**, sp. n., *scapularis*, ‡ Lec.

Elongate, attenuate behind; head, thorax, and under side densely pubescent; elytra shining, deeply punctate striate (punctures large, closely packed), intervals smooth; humeral angles with an oblique red vitta. L. .24. Texas boundary.

This cannot easily be identified with *E. scapularis*, Lac., as the thorax is coarsely and strongly punctate.

2. **E. vittata**, Lec. J. Acad., iv. 26.

Differs from *E. Lecontii* by the punctuation of the thorax, which is fine and sparse; the elytral vitta is curved and prolonged nearly to the apex. L. .26, Texas (Pope).

Coscinoptera, Lec.

1. **C. æneipennis** (Lec.), J. Acad., iv. 26.

Head, thorax, and under surface pubescent; elytra brassy, glabrous, deeply subseriate, impunctate; thorax finely and closely punctate, median line smooth. L. .26, Texas.

Closely allied to *C. cribrata*, Lac., but he does not mention the red labrum, and describes the legs and antennæ as red.

2. **C. æneascens**, sp. n.

Black, pubescent, above brassy, labrum bordered with yellow, thorax closely punctate, medial line smooth; elytra closely and evidently punctate, punctures arranged rather in rows; tibiæ piceous. L. .18, Southern States.

3. **C. axillaris**, Lec., Tr. Ent. Soc., 1868, p. 56.

Cylindrical, narrow, brassy black, clothed with a whitish pubescence; thorax with the hind angles prominent, rather sparingly evidently punctate, medial line hardly visible; elytra coarsely serially punctate, interstices sparsely punctate, humeral angle fulvous. L. .12. Colorado (Leconte).

4. **C. mucorea** (Lec.), Pr. Acad., 1858, 83.

Cylindrical, very densely clothed with whitish pubescence, brassy; thorax rather sparingly punctate; elytra with the callus red, striate punctate; interstices transversely rugulose, the punctures obsolete towards the apex. L. .21. California (Leconte).

5. **C. dominicana** (Fab., 1801), Lac. Mon., ii. p. 515, 6.

Black, oblong, clothed sparingly with a whitish pubescence; labrum yellow; thorax closely punctate, median line smooth; elytra closely punctate. L. .20–.22. Southern and Western States. *C. franciscana*, Lec., does not differ specifically.

6. **C. subfasciata**, Lec., Tr. Ent. Soc., 1868, p. 56.

Cylindrical, black, labrum black, sparsely pubescent above; thorax evidently not thickly punctate, median line obsolete; hind angles prominent; elytra shining, coarsely and sparingly punctate; humeral angles with a large quadrate red spot. L. .25–.30. Arizona, Lec.

Var.—Elytra with a basal fascia fulvous.

7. **C. major**, sp. n.

Very similar to *C. subfasciata*, but much larger, more convex; hind angles of thorax not prominent, the basal spot is large, but the callus is black; the punctuation also is a little closer. L. .42. Texas.

8. **C. vittigera**, Lec., Pr. Acad., 1861, p. 357.

Very distinct by the Clytra-like form parallel; thorax short,

unequal sparingly and deeply punctate; elytra coarsely and rather sparingly punctate, each with an equally broad fulvous vitta from the shoulder to the apex, where it recurves to meet the suture. L. .21. Kansas (Leconte).

CRYPTOCEPHALIDES.

A. Antennæ short, dentate received in grooves. Chlamydini.
B. Antennæ with joints 5–11 dentate. *Chlamys.*
Bb. Antennæ with joints 6–11 dentate. *Exema.*
Ab. Antennæ tolerably long, free. Cryptocephalini.
B. Thorax not margined or impressed at base.
C. Antennæ thickened, prosternum broader than long. *Monachus.*
Cb. Antennæ long, filiform, prosternum long. *Cryptocephalus.*
Bb. Thorax with an impressed margin along the base.
C. Prosternum flat. *Griburius.*
Cb. Prosternum grooved, pointed behind. *Pachybrachys.*

CHLAMYS, Knoch.

A. Legs black, above metallic. *plicata.*
B. Legs red, above black. *foveolata.*

I am unable to separate *C. assimilis*, Klug, and *C. polycocca*, Lac., from *C. plicata.* Of *C. tuberculata*, Klug, I have seen no specimens.

EXEMA, Lac.

A. Metallic, subcupreous. *gibber.*
B. Black or varied with fulvous. *conspersa.*

Mannerheim's *conspersa* is evidently identical with *E. dispar*, Lac., which is a most variable little species.

MONACHUS, Chev.

A. Steel blue; legs concolorous. *saponatus, seminulum.*
Ab. Steel blue; legs red.
B. Thorax with a basal row of deep punctures. *auritus.*
Bb. Thorax red with no basal punctures. *thoracica.*

I am unable to distinguish *M. ater*, Hald., and *M. seminulum*, Suffr. I have not seen; it is quite small ($\frac{3}{4}$ lin.), clypeus, basal joint of antennæ, and anterior tibiæ reddish; the punctuation is much as in *saponatus.* Suff. Linn. Ent. xii. 344, 4. Georgia.

M. affinis, Hald. is the ♀ of *M. auritus.*

M. Thoracica, sp. n.

Very like *M. saponatus* in form, size, and sculpture; but the head, thorax, and legs entirely red, the thorax also is devoid of the basal line of punctures. L. .16. South Carolina, Florida (Leconte).

M. guerini, Perbosc, has been found in Sonora, and is easily known by the red thorax with two green spots, and elytra blue with a red band.

Cryptocephalus, Geoff.

So many species of this genus have been described by Suffrian that I am unable to make a proper table of the species. I hope, however, in time, to get a good series revised by him. The groups into which he divides the genus are hardly satisfactory, and I have used the ♂ characters in preference.

A. First ventral segment with a large plate produced into two acute diverging points behind; prosternum with an acute tubercle between the coxæ. Here belong *C. lituratus*, Fabr. (from which I doubt the propriety of separating *C. lativittis*, *S. villatus*), *C. congestus*, Fabr., *formosus*, Mels., *detritus*, Oliv., *sellatus*, Suff.; also *C. sulphuripennis*, Mels., *areolatus*, Suff., *maminifer*, Newm. *egenus*, Suff., which appear to me doubtful.

B. Prosternum with the anterior edge carinate or produced in the ♂.

C. Prosternum alike in both sexes.

C. vitticollis, Lec. appears to me not to differ from *C. leucomelas*, Suff.

C. mucoreus, Lec. is very distinct by its pubescent upper surface.

C. schreibersii, Suff. is also very distinct by the closely rugulose thorax.

In the group of very small species at the end of the genus I have recognized *C. catarius*, Suff., *C. auratus*, Fab. (with which I unite *C. æneolus*, Lec., *C. chalconotus*, Mann., *C. viridis*, Hald.) *C. atomus*, Suff., *C. chlorizans*, *nanus*, *luscus*, *pallidicornis*, remain unknown to me. *C. gracilis* rests on the original Fabrician example of *C. parvulus*, which is identical with the European species; as this is the only specimen, and the only species common to the two countries, it seems to me better to omit it. *C. lævis*

Hald. is probably only *C. auratus* or *C. atomus;* the type is not now extant. *C. pumilus*, Hald. is closely allied to *C. nanus.*

Griburius, Hald. (Scolochrus, Suff.)

A. Legs yellow.	
B. Above black, elytra with orange spots.	*scutellaris.*
Bb. Above yellow, with black spots.	*larvatus.*
Ab. Legs black and white, elytra with the suture white.	*Montezumæ.*
Ac. Legs entirely black, elytra with two red spots.	*Lecontii.*

G. speciosus, Lec. appears to me to agree with the description of *Scolochrus Montezumæ*, Suffr. *G. larvatus* may be a pale form of *G. scutellaris*, but the thorax is less punctate.

G. Lecontii, sp. n.

Black, clothed beneath with a gray pubescence; head with the clypeus and a large triangular frontal mark whitish-yellow; thorax shining, with scattered deep punctures and a few minute ones intermixed; base deeply impressed; scutellum punctate; elytra with the basal half and sometimes an apical spot dull red, deeply punctate striate, the striæ near the suture confused, interstices rugulose. L. .16. Texas.

Pachybrachys, Chevr.

This genus is extremely rich in species and very variable; Suffrian has described many entirely unknown to me, some of which I cannot think will stand. One species from Lower California appears to me entirely new.

P. Xanti, sp. n.

Ochreous, cylindrical, very slightly covered with short erect hairs; head with a brown frontal dash, eyes not closely approximate in the ♂; thorax very long, nearly quadrate, with a smooth discoidal line and no basal impression, ochreous, irrorated with brown, thickly covered with deep elongate punctures, interstices faintly punctulate; scutellum small; elytra opaque, ochreous, the punctures brown, serially disposed at the sides, irregularly towards the suture; beneath pubescent, metasternum nearly black. L. .10 –.12. Lower California (Leconte).

♂ anterior tibiæ curved.

EUMOLPIDES.

Anterior coxæ globose, never transverse, third joint of tarsi deeply bilobed.

A. Pubescent or squamulate.

Thorax not margined at the sides.

Prosternum separate from its episterna.

Subquadrate, brown. *Adoxus.*

Metallic, eyes with a deep groove above them. *Heteraspis.*

Prosternum not separate from its episterna.

Thorax transverse, flattened. *Xanthonia.*

Thorax cylindric. *Fidia.*

Thorax margined.

Elytra striate, sides of thorax denticulate. *Myochrous.*

Elytra punctate, thorax entire. *Glyptoscelis.*

B. Glabrous.

Thorax lobed behind the eyes, head immersed.

Claws appendiculate, elytra punctate.

Thorax not margined at base, small, globose. *Chalcoparia.*

Thorax margined, oblong.

Antennæ not long, heavily clubbed. *Chrysochus.*

Antennæ long, filiform. *Typophorus.*

Claws bifid; elytra striate punctate. *Paria.*

Thorax not lobed behind the eyes.

Second and third joints of antennæ equal.

Head broad, not sulcate above the eyes. *Metaparia.*

Head rather narrow, with a groove round the eyes. *Metachroma.*

Second joint of antennæ shorter than the third. *Colaspis.*

ADOXUS, Kirby (*typ.* vitis).

A. vitis. (Linn.)

Broad, subquadrate; head and thorax narrow; black, tibiæ and antennæ with the club dark; elytra reddish-brown; surface clothed with golden pubescence; thorax closely punctate; elytra irregularly punctate (the translucent spots are arranged in rows, but the real punctures are not so). L. .21. Middle States, Lake Superior, Oregon, Europe.

FIDIA, Dej. (*typ.* murina).

1. **F. murina.** (Dej. Cat.) sp. n.

Elongate, subcylindric; legs very long, entirely brownish-red throughout and clothed with a dense gray pubescence; head and

thorax evidently not densely punctate, that with a smooth medial line, this longer than broad, cylindric elytra deeply punctate striate, interstices sparsely rugose, with a few deeper punctures. L. .26. Middle and Southern States.

♂ metasternum and first ventral segment smooth in the middle; second with a smooth rounded fovea, fifth with a transverse punctate fovea.

2. **F. longipes** (Mels.), Pr. Acad., iii. 169, 1; *viticolus* (Uhler.) Pr. Acad., vii. 418.

Allied to the preceding, but smaller, black; pubescence ashy; base of femora and of antennæ red; head and thorax more densely punctate; that without median line. L. .24. Middle and Southern States.

♂. First ventral segment smooth in the middle.

XANTHONIA, Baly. (*typ.* 10-notatus Say).

1. **X. 10-notatus**, J. Acad., iii. 445.

Subquadrate, scabrous, brownish-red, with a suberect brown pubescence; head and thorax densely punctate, the punctures umbilicate; elytra confusedly densely punctate; interstices of the punctures shining; marked with various indeterminate black markings; under side black, opaque; antennæ pale-red. L. .12. Atlantic region.

Very variable, sometimes unicolorous testaceous.

2. **X. villosulus** (Mels.), J. Acad., iii. p. 169, 2.

Very closely allied to *X.* 10-*notata*, but uniformly testaceous; elytra substriate punctate. L. .13. Middle and Southern States.

Var. Entirely black above.

3. **X. Stevensii**, Baly, J. of Ent., ii. 151.

Oblong, subcylindrical, fulvous, subnitidous, covered with fine concolorous hairs; eyes and apex of jaws black. L. 1½ lin. Canada.

Head short, subrotundate, closely punctate; epistoma concave, face impressed; thorax transverse; elytra closely punctate, punctures confused near the suture, arranged in striæ on the disk.

HETERASPIS (Chev.), Lec.

1. **H. pubescens** (Mels.), Pr. Acad., iii. 169, 3.

Oblong, æneo-cupreous, sparsely clothed with a gray pubescence;

surface alutaceous; head little punctate, deeply foveolate; thorax about as long as broad, sparsely punctate; sides more or less transversly rugose; elytra sparingly punctate, with traces of seriate punctures, and a sutural stria evident behind; base with a reflexed margin; under side densely but obsoletely punctulate. L. .13. Middle and Southern States.

2. **H. curtipennis** (Mels.), l. c. n. 4.

Much smaller; thorax entirely rugose; eyes very prominent; elytra more strongly punctate. L. .9. Middle and Southern States.

3. **H. marcassita** (Zimm. MSS.), sp. n.

Closely resembling *H. pubescens*, but the clypeus is deeply and acutely emarginate in front, with the lateral lobes also prominent; the thorax is not rugose; the form is shorter, the elytra more visibly striate, and the basal margin does not reach the scutellum. L. .12–.13. Middle and Southern States.

4. **H. nebulosus**, Lec.

Also very near *H. pubescens* and with the clypeus truncate, but the thorax is not rugose, but has smooth reliefs on the disk; the elytra are more evidently striate punctate; the pubescence is stronger and more marbled; the basal margin of the elytra is incomplete. L. .13. Kansas, Iowa, and Wisconsin.

5. **H. smaragdulus**, Lec.

Apparently distinct by the uniform metallic green color, but otherwise extremely close to *H. nebulosus*.

Glyptoscelis, Lec.

1. **G. hirtus** (Oliv.), Ent. vi. 96, p. 906, t. 1. f. 16.

Cylindrical, brilliant cupreous, tolerably thickly clothed with a decumbent pubescence of white and brown hairs intermixed; thorax and elytra deeply and closely punctate, the sides of the former suddenly narrowed towards the base. L. .35–.40. Middle and Southern States, Oregon.

This may be known by the parti-colored pubescence, and the nearly bare scutellum.

2. **G. illustris**, sp. n.

Cylindric, of a brilliant burnished copper color; very sparingly

pubescent, but the elytra with the base, margin, suture, and a discal spot clothed with long white hairs; less closely punctate than *G. hirtus*, and the sides of the thorax gradually narrowed to the base. L. .40–.41. California (Horn), Oregon (Walsingham).

Very distinct by the irregular pubescence.

♂ Last ventral segment with a deep smooth fovea.

3. **G. albidus**, Lec., Proc. Acad. 1859, 81.

Cylindrical, allied to *G. hirtus*, but rather densely clothed with squamiform, pale hairs; thorax and elytra less closely punctate. L. .30–.32. California.

4. **G. barbatus** (Say), J. Acad., v. 296.

Shorter and stouter than the other species; thorax distinctly narrower than the elytra, strongly and closely punctate, as in *G. hirtus;* surface densely clothed with uniform brown hairs. L. .30. Pennsylvania.

5. **G. squamulatus**, sp. n.

Cylindric; thorax subelongate, sides straight; punctuation rather open; surface densely clothed above and below with whitish elongate scales. L. .30. California (Leconte); Oregon (Walsingham).

6. **G. crypticus**, Say, J. Acad., iii. 449.

Form and size of *G. hirtus*, more sparingly punctate; clothed throughout with a whitish subsquamiform pubescence; claws much less strongly bifid. L. .30. Atlantic region.

♂ Elytra mucronate at the apex; last ventral segment with a smooth fovea.

7. **G. alternatus**, sp. n.

Very similar to *G. crypticus*, but with the pubescence on the elytra denser on the alternate interstices, so as to give a faint striped appearance. Thorax with the sides rounded. L. .37. California (Horn).

♂ Elytra not mucronate; last ventral segment with a smooth fovea.

8. **G. cuprascens** (Lec.), Pr. Acad. 1858, 85.

Subquadrate, shining, cupreous, rather sparingly clothed with short erect hairs; upper surface evidently and not closely punctate, interstices of the punctures shining; thorax subtransverse,

and sides oblique; front margin not produced. L. .19. California (Leconte).

9. **G. smaragdulus** (Lec.), Pac. R. Rep. p. 67.

Very closely allied to *G. cuprascens*, but greenish-blue, very shortly and slightly pubescent; thorax always more finely and more densely punctate than the elytra. L. .17–.19. California (Leconte).

These two species have the appearance of *Heteraspis*, but agree with *Glyptoscelis* in the punctate elytra, lobed thorax, etc.

Myochrous (Chev.), Lec.

1. **M. denticollis** (Say), J. Acad., iii. 448.

Subelongate, subæneous, densely clothed with easily abraded gray scale-like hairs; antennal club infuscate, legs subæneous; head and thorax very densely and not strongly punctate, opaque, subscabrous, the latter broader than long; front angles deflexed, sides tridentate; elytra with about sixteen rows of closely packed deeply impressed punctures; interstices hardly visible; under side evidently punctate. L. .20–.22. Texas, Southern and Western States.

2. **M. longulus**, Lec. Pr. Acad. 1858, 86.

More elongate, parallel; thorax longer than broad, sparingly punctate; elytra punctate striate; interstices as broad as the punctures; surface densely clothed with yellowish scale-like hairs. L. .20. California.

3. **M. squamosus**, Lec. Col. Kans. p. 24.

Form of *M. denticollis*, but thorax rather longer than broad; sides not denticulate; surface closely and densely rugulose; elytra with thirteen punctate striæ; punctures not deep; interstices closely punctulate; surface covered with short rounded scales. L. .20 Kansas, Colorado.

Chrysochus, Chev.

1. **C. auratus**, Fab. Syst. El., i. p. 419.

Oblong, convex, brilliant polished green; elytra golden-green varied with coppery; head and thorax very sparsely coarsely punctate, surface covered with minute sparse punctures; elytra

finely and irregularly punctate; ventral surface and thoracic epipleuræ hardly punctate. L. .40. Atlantic region, Arizona.

2. **C. cobaltinus**, Lec. Pac. R. Rep., p. 67.

Extremely close to the preceding, but entirely of a deep-blue color or blue-green; clypeus closely punctate. L. .40–.41. California, and Oregon.

Three other species are described by the Rev. T. A. Marshall (J. Linn. Soc., viii. p. 449).

C. californicus, bluish-green (not dark-blue), thorax broader, more gibbous at the sides. L. 8 lin. (= cobaltinus, Lec.)

C. tenibricosus, black tinged with blue, thorax not gibbous or dilated at the sides. L. 5 lin. (? cobatinus var.)

C. castaneus, chestnut-colored, beneath testaceous; thorax transverse, very slightly dilated, densely covered with two sorts of punctures; elytra substriate punctate. (immaturus.)

Typophorus, Chev.

Thorax lobed behind the eyes, head broad, antennæ distant, no ocular sulci, antennæ long filiform, second joint very short, third longer than the fourth, posterior tibiæ produced at the apex.

1. **T. tricolor** (Fab.), Ent. Syst., i. 316, 41; *viridis*, Fab. Syst. El., i. 413, 8; *picipes*, Ol.

Oblong, sub-parallel, above green or bronzed, beneath brown, legs and antennæ pale-red; head closely punctate, clypeus raised on a level above the front; thorax closely punctate, sides very little rounded, slightly explanate, disk with a smooth space towards the base; elytra irregularly rather coarsely punctate; under side scarcely punctulate, thoracic epipleuræ closely punctate. L. .20–.24. Middle and Southern States. ♂ Apex of elytra slightly mucronate, fifth segment foveolate.

2. **T. metasternalis**, sp. n.

Very similar to the preceding, but elytra more sparsely punctate, subcastate; ventral segments and metasternum closely and deeply punctate. L. .22. Illinois.

3. **T. oregonensis**, sp. n.

Very closely allied to *T. tricolor*, but distinct by the well-marked hind angles of the thorax, which is also more sparsely and more strongly punctate; the ventral segment and metasternum are

also roughly punctate. L. .24. Oregon (Walsingham). The color varies from blue to green or golden.

Chalcoparia, g. n.

Head deeply immersed, antennæ distant, eyes not emarginate, no ocular sulci; thorax hardly lobed behind the eyes, antennæ with joints 2–4 equal, short; tibiæ not produced at the apex, claws appendiculate. This genus is formed for a small globose species having the aspect of *Colaspis tristis*, but the thorax is not margined behind, a character unique in the N. American *Eumolpidæ*.

1. **C. globosa**, Oliv. Ent., vi. p. 893.

Globose, shining, cupreous; antennæ, four anterior legs, and posterior tibiæ red; head sparingly punctate, front impressed; thorax transverse, deeply emarginate for the head, evidently punctate, sides slightly rounded, finely margined, base immarginate with a row of punctures along the edge; elytra deeply irregularly punctate, punctures sometimes subseriate. L. .10. Middle and Southern States, Texas.

Paria, Lec.

Eyes bordered by a deeply impressed base; posterior tibiæ broadly emarginate at tip, claws bifid; thorax lobed behind the eyes; elytra striate punctate; antennæ with second joint shorter than third.

1. **P. 6-notata** (Say), J. Acad., iii. 445.

Oblong, short, yellowish-red, ventral segments and three spots on each elytron black; head coarsely punctate; thorax margined, sides slightly rounded, sparsely punctate; elytra deeply punctate striate, interstices smooth, striæ obsolete before the apex. L. .12–.16. Atlantic region, extending also to California.

Var. 6-*guttata*, Lec. Pr. Acad., 1858, 86.
Elytra with the two lower spots united.

Var. 6-*notata* (Say), l. c., 446.
Thorax black, elytra with the spots much larger.

Var. Gilvipes (Dej.).
Entirely black, legs pale.

Many intermediate forms occur, especially one with the thorax and scutellar region red, the rest black.

2. **P. aterrima** (Oliv.), Enc. Meth., 6, 913.

Extremely like the preceding, and similarly variable, but the head is much less punctate, thorax less punctate and minutely alutaceous. L. .12–.16.

The dark varieties seem more common than the pale ones in this species. *P. opacicollis*, Lec., seems to be a small pale specimen with unusually opaque thorax.

3. **P. lævicollis**, sp. n.

Also extremely like *P. 6-notata*, but head and thorax scarcely visibly and very sparingly punctulate; elytra with two spots, one basal and one larger medial. L. .15. Pennsylvania, Wisconsin.

4. **P. pumila**, Lec. Col. Trans., p. 23.

Entirely yellowish-red, shape of *P. 6-notata*, but much smaller; thorax smooth, elytra obsoletely seriate punctate, the punctures coarse but very sparse; ocular grooves produced in front so as to meet on the front above the clypeus. L. .10. Kansas (Leconte).

5. **P. viridicyanea**, sp. n.

Bluish-green (or rarely æneous); antennæ red, club infuscate; head foveolate, ocular sulci deep; second joint of antennæ distinctly shorter than third; thorax alutaceous, sparingly punctate subquadrate, narrow in front, anterior angles deflexed, sides nearly straight; elytra punctate, striate, smooth. L. .30. Middle and Southern States, Illinois, Mexico.

This species is a little anomalous, but the ocular sulci and thoracic lobes clearly belong here.

METAPARIA, g. n.

Head broad, antennæ distant, eyes emarginate, not bordered by a groove; deeply inserted in the thorax which is not lobed behind the eyes; antennæ with joints 2–4 equal, claws appendiculate, tibiæ dentate at tip.

1. **M. elytroides**, sp. n.

Oblong, parallel, green, antennæ and legs red; surface alutaceous; head very sparingly and obsoletely punctulate, front impressed, vertical; thorax transverse, produced in front over the head, sides

oblique, rounded, evidently (disk more sparingly) punctate; scutellum alutaceous; elytra irregularly punctate; under side and epipleuræ nearly smooth. L. .15 Texas.

METACHROMA (Chevr.) (*typ.* quercata, Fab.)

Antennæ with the second and third joints equal, fourth as long as the fifth; posterior tibiæ broadly emarginate at tip; eyes bordered by a deep impression.

1. **M. angustulum**, sp. n.

Narrow, parallel, black, base of antennæ, legs, and upper surface yellow; head shining, sparsely punctate, postocular sulci faint, medial line impressed; thorax broader than long, sparingly punctate, anterior angles not auriculate; scutellum alutaceous, with two or three impressed punctures; elytra punctate striate, the first three regular, the others rather confused, especially towards the apex; ventral segments sparingly and obsoletely punctate. L. .23. Missouri, Illinois, L. Superior, Kansas.

♂ Ventral segments concave, first with a small acute tubercle on the apical margin in the middle.

Var. Thorax more or less suffused with black.

Var. Elytra black, margins narrowly pale.

Var. Elytra entirely black, thorax and scutellum red.

2. **M. californicum**, sp. n.

Subelongate parallel, reddish-brown, shining; head strongly and rather closely punctate, median line impressed, ocular sulci not converging; thorax slightly produced in front, sides acutely reflexed, slightly rounded, disk sparingly, sides closely punctate; elytra regularly striate punctate, interstices very finely and sparingly punctulate, eighth broad. L. .18. California (Horn).

3. **M. ustum**, Lec. Pr. Acad., 1858, 85.

Brownish-red varied with paler; head evidently punctate, clypeus with the sides reflexed, broadly emarginate, labrum prominent, trilobed; thorax broader than long, evidently more closely punctate, sides rounded, anterior angles auriculate; elytra strongly punctate striate, the punctures obsolete towards the apex, the striæ confused externally. L. .23–.24. Texas (Leconte).

4. **M. dubiosum** (Say), J. Acad., iii. 447; *suturale*, Lec. Pr. Acad., 1858, 85.

Black, legs pale, knees broadly infuscate, head nearly smooth, two frontal spots, a fine raised middle line on the front; thorax

broader than long, sides much deflexed, rounded, narrowed behind, evidently punctate; elytra red, suture broadly black; striate punctate, ten striæ visible at the base; the sixth interstice with a few punctures, eighth broad, with a supplementary stria inclosed in it. L. .13–.22. Atlantic region, Texas.

♂ Last ventral segment with a smooth medial line.

5. **M. interruptum** (Say), J. Acad., iii. 448.

Oblong, reddish-brown (varying from yellowish-red to black beneath); head coarsely punctate, labrum prominent, hardly tridentate in front; thorax broader than long, disk sparingly, sides closely punctate; front angles auriculate, sides strongly rounded, hind angles very obtuse, color red, with the discal third red or black; scutellum alutaceous with a few visible punctures; elytra yellowish-red (or with an interrupted dorsal vitta and the suture black), punctate striate, the external striæ quite confused, interstices irregularly and very sparingly punctulate; ventral segments sparingly punctate and pubescent, hind angles of thoracic epipleuræ punctate. L. .22. Kansas (Leconte).

6. **M. peninsulare**, sp. n.

Near *M. ustum* in color and shape, but thorax closely and densely punctate, head coarsely punctate, the tubercles above the antennæ but little marked; thorax with the sides steeply deflexed, broadly rounded; scutellum alutaceous, with four or five punctures; elytra punctate striate, the striæ as in *suturale;* thoracic epipleuræ punctate at the hind angles. L. .20. California (Leconte).

Closely allied to the preceding, but distinct from all by the densely punctate thorax, from *suturale* and *ustum* by the punctate epipleuræ, from *interruptum* by the regular striæ.

7. **M. quercatum** (Fabr.), Syst. El., i. 507, *punctivolle*, Lec. Pr. Acad., 1858, p. 85.

Reddish-brown or black, variable; head almost smooth, front even; thorax densely rugosely punctate, sides steeply deflexed, strongly rounded; elytra finely alutaceous, rather obsoletely and irregularly punctate striate; thoracic epipleuræ smooth. L. .12–.20. Middle and Southern States, Texas.

Olivier's description of *C. quercata* shows that it refers to this insect.

8. **M. vicinum** (Zimm. MSS.), sp. n.

Depressed, subparallel, rather like *M. augustatum;* brownish beneath, antennæ and legs pale yellowish-red; head piceous, pale in front, evidently punctate, front even; thorax piceous, rather coarsely and closely punctate, sides hardly deflexed and but little rounded; elytra smooth, rather regularly punctate striate, margins brown. L. .12. South Carolina.

9. **M. marginale** (Zimm. MSS.), sp. n.

Allied to *M. vicinum* in color and form, but the ocular sulci meet across the front, which is evidently punctate and opaque; thorax transverse, sides strongly rounded, but not much deflexed, finely alutaceous, closely punctate; scutellum black; elytra tolerably regularly punctate striate, margins pitchy. L. .16. North Carolina, Kansas.

10. **M. floridanum**, sp. n.

Oblong subparallel depressed, entirely testaceous, surface alutaceous; head with the ocular sulci well marked, meeting in the middle, and with a short impressed medial line; thorax finely, obsoletely, and sparingly punctulate, sides not strongly rounded; elytra regularly punctate striate, eighth interstice broad, inclosing two small striæ. L. .18. Florida (Doubleday).

Distinct by the finely punctulate thorax and alutaceous sculpture.

11. **M. pallidum** (Say), J. Acad., iii. 446.

Oblong, testaceous red; head as in *M. floridanum;* thorax shining, evidently and tolerably closely punctate, sides rather deflexed, strongly rounded; elytra regularly striate as in *M. floridanum.* L. .12–.13. North Carolina (Zimmerman).

12. **M. lævicolle** (Zimm. MSS.), sp. n.

Oblong, entirely testaceous, and closely allied to *M. pallidum;* but front even, head and thorax smooth, shining, the latter more produced in front, less transverse, sides rounded. L. .11. North Carolina (Zimmerman).

13. **M. pellucidum** (Zimm. MSS.), sp. n.

Allied to *M. lævicolle*, with which it agrees in the less transverse more deflexed thorax; head smooth, sulci deep, meeting in the middle, medial line impressed; thorax shining, sparingly punctulate; elytra finely punctate striate, striæ obsolete beyond the middle. L. .11. North Carolina (Zimmerman).

14. **M. laterale** (Zimm. MSS.), sp. n.

This little species is testaceous, the elytra, however, have a black subtriangular spot on the external margin; the head is sulcate across the front, but with no medial line; the thorax is made as in *M. pellucidus*, but is a little shorter, though the sides are similarly rounded. L. .11. North Carolina, Kansas.

[These species of *Metachroma* are very hard to separate accurately, but will, I believe, be found eventually to be really distinct; they are, as far as I am aware, rare in collections.]

Colaspis, Fabr.

1. **C. favosa** (Say), J. Acad., iii. 448.

Entirely metallic blue or green; antennæ yellowish, red at the base; legs black or brownish; head sparingly punctate; antennal tubercles smooth, coppery; eyes emarginate; thorax rather transverse, sides broadly rounded, reflexed, somewhat explanate; base rounded, thickly and deeply (disk more sparingly) punctate; scutellum smooth, elytra deeply and closely multiseriate punctate; ventral segments alutaceous, hardly punctate, epipleuræ of the prothorax punctate. L. .23–.25.

Southern and Western States. Purple varieties also occur.

2. **C. brunnea** (Fab.), Suppl. 94, 4; *sulla*, Fab., Sys. El., i. 417, 24; *lurida*, Oliv. Ent., vi. 892; *flavida*, Say, Long's Exp., ii. 295.

Entirely ochreous or testaceous; head and thorax as in *C. favosa*, except that the sides of the latter are not so broadly reflexed; elytra with eight smooth subcostate interstices, the punctures between them sometimes uniseriate, and at others irregular or triseriate; thoracic epipleuræ punctate. L. 23. Atlantic region.

Var. costipennis. Head and thorax metallic green; elytra brown with four yellow costate interstices.

Every lead can be found between these extremes.

3. **C. prætexta**, Say, J. Acad., iii. p. 442.

Shape of *C. favosa*, above dark copper color, beneath brown; legs and antennæ ferruginous; head sparsely punctate, front channelled, antennal tubercles smooth, nearly united across the middle; thorax as in *C. favosa*, but less punctate; elytra irregularly and sparsely punctate; punctures sometimes subseriate behind; epipleuræ nearly smooth. L. .22–.24. Atlantic region;

on the myrtle (according to Say). This cannot, I think, be the *C. picipes*, Oliv., for the thorax there is finely punctate and the legs obscure; it was probably *Typophorus tricolor*.

4. **C. arizonæ**, sp. n.

Oblong, ovate; reddish-brown, elytra red; head rugosely punctate; clypeus nearly smooth, emarginate; antennæ very distant; thorax transverse, sides but little rounded, rather broadly explanate, coarsely rugosely punctate; elytra rugosely punctate with traces of smooth raised interstices; under side alutaceous, faintly punctulate; thoracic epipleuræ with a few punctures. L. .32. Arizona (Leconte).

♂ 5th segment triangularly emarginate.

The anterior tibiæ are deeply sulcate for the tarsi and bidentate at the apex.

5. **C. nigrocyanea**, sp. n.

Ovate, bluish-black, beneath purplish; thorax deeply and very closely punctate; the interstices irregularly broad and smooth; sides explanate, distinctly angulate in the middle; epipleuræ deeply punctate; elytra deeply and closely seriate punctate, the rows somewhat geminate; ventral segments alutaceous, hardly punctulate. L. .23. Arizona (Leconte).

The unique specimen before me is unfortunately without a head.

6. **C. tristis**, Oliv. Enc. Méth., v. 889; *pilula*, Germ. sp. nov., p. 567; *ovata*, Say, J. Acad., iii. 442; *convexa*, Say, l. c. p. 443; *puncticollis*, Say, l. c., *humeralis*; Lec. Pr. Acad. 1858, p. 85.

This is the most variable insect in sculpture and form that I have seen; but I am entirely unable to draw any lines between the forms quoted above. It is convex, shortly ovate; antennæ comparatively short; last five joints distinctly thickened, base yellowish; the head is finely and sparingly punctate; thorax subtransverse, sides margined, rounded, hind angles prominent, rectangular; base margined with a row of punctures inside the margin; disk variously punctate, sometimes with close rather elongate punctures, or sparsely and rather finely punctate; elytra either deeply irregularly punctate, or more finely and subseriate punctate; the rows geminate, leaving irregular smooth interstices, humeral callus always prominent; legs black or red; epipleuræ punctate or almost smooth. L. .16–.18. Atlantic region.

CHRYSOMELIDES.

Anterior coxal cavities closed, metasternum very short. *Timarcha.*
Anterior coxal cavities open.
Post. episterna elongate triangular, metasternum with a post coxal line following the margin.
Claws simple.
Thorax margined at base.
Tarsi with the 3d joint entire. *Chrysomela.*
Tarsi with the 3d joint emarginate or bilobed. *Gastrophysa.*
Thorax immarginate.
Prosternum produced behind. *Prasocuris.*
Tibiæ excavated at the apex. *Entomoscelis.*
Claws dentate.
Tibiæ produced at apex. *Gonioctena.*
Tibiæ simple, 3d joint of tarsi bifid. *Phyllodecta.*
Post. episterna parallel, post coxal line oblique, cutting off the external angle of the metasternum. *Plagiodera.*

1. TIMARCHA, Meg.

1. **T. intricata**, Hald. Proc. Phil., vi. 363. (1854.)

T. intertexta, Hald. is only a variety.

2. **T. cerdo**, Stäl., l. c., p. 8, 2.

Western America (Deyrolle.) Differs by being smaller, narrower, and with a bronzed color; the thorax also appears to be equally punctate.

This subfamily has been carefully studied first by Mr. Rogers in the Proceedings of the Academy for 1856, p. 29, and lately by C. Stäl in a quarto extract from the Transactions of the Swedish Academy. Mr. Rogers' paper was also translated and revised by Suffrian (Stett. Ent. Zeit. xix., p. 237, 1858). Hence I have merely given tables of the species with remarks where necessary.

2. CHRYSOMELA.

Last joint of palpi small, truncate.
Mesosternum produced in front. *Labidomera.*
Mesosternum simple. *Myocoryna.*
Last joint of palpi dilated.
Claws approximate, claw joint dentate beneath. *Zygogramma.*
Claws distant, claw joint simple.
Thorax not margined. *Calligrapha.*
Thorax thickly margined. *Chrysomela.*

A. LABIDOMERA, Chevr.

1. **C. cliviicollis**, Kirby. Faun, B. A., iv. 213. *trimaculata*, Fab. (nec. Linn., Syst, p. 312).

C. Rogersii, Lec. appears to me to be simply a variety of this species.

B. MYOCORYNA, Stäl.

a. Unicolorous blue.	*Haldemani.*
b. Unicolorous red, legs black.	*rubiginosa.*
c. Thorax æneous.	
1. Elytra with four æneous vittæ.	*lineolata.*
2. Elytra with two vittæ.	*Dahlbomi.*
d. Thorax maculate.	
1. Entirely black beneath.	11-*lineata.*
2. Pale, spotted with black, beneath.	
* Elytra regularly striate punctate.	*juncta.*
** Striæ confusedly punctate.	10-*lineata.*

2. **C. lineolata**, Stäl. Chrys. Amer., p. 140, 298.

"Æneous, thorax thickly and finely punctate, elytra yellow, striæ geminate, not very regularly punctate, alternate interstices black, interrupted; legs æneous, tibiæ pale." L. 8 mm. Texas (Chevrolat).

3. **C. 11-lineata**, Stäl, l. c. p. 163, 301.

Black, above pale yellow, head with a frontal spot, and thorax with various marks black; elytra with the suture, and vittæ, and the epipleuræ æneous. L. .44. Southern coast range of California (Horn), Mexico (Stäl).

4. **C. 10-lineata**, Say, J. Acad., iii. 453.

The common species appears to be the true species of Say, which Stäl had not seen, his *mutilineata* differs in having the posterior portion of the epipleura black, and the marginal and sutural vittæ joined at the apex, and is a Mexican species.

5. **C. juncta**, Germ., sp. nov. p. 590.

Differs from the preceding by the regular punctures in the striæ. *C. defecta*, Stäl (l. c. 165–304) is a variety in which the fourth and eighth interstices are confluent, and the other two abbreviated; but a specimen in Leconte's collection from Tamaulipas is intermediate in this respect.

6. **C. Dahlbomi**, Stäl, l. c. p. 156, 307.

Æneous, legs and under side testaceous, tinged with brassy;

elytra regularly striate punctate, with the 3d and 8-9th interstices yellow. L. 7 mm. Texas, Mexico (Chevrolat).

7 **C. Haldemani**, Rogers, l. c.

8. **C. rubiginosa**, Rogers, l. c.

C. ZYGOGRAMMA, Ev.

a. Thorax unicolorous brown or brassy.

1. First and second interstices brown, forming a sutural vitta. *suturalis.*

2. Second interstice brown, exterior vittæ irregular. *disrupta.*

b. Thorax brown, anterior angles broadly ochreous, interstices punctate.

1. First vittæ free, not joined to the suture. *exclamationis.*

2. First vittæ confused with the sutural line.

Two lateral vittæ joined a little before the apex, no extra marks. *continua.*

Lateral vittæ joined at ⅔, traces of the external vittæ visible. *conjuncta.*

9. **C. exclamationis**, Fabr., Rogers, l. c.

10. **C. conjuncta**, Rogers, l. c.

With this is to be united *C. stolata*, Suffr. from Mexico, and *C. pallida*, Bland; both differing in the more or less interrupted vittæ.

11. **C. continua**, Lec., Tr. Ent. Soc. 1868, p. 57.

Very near *C. conjuncta*, but with two lateral rather broad brown vittæ and no traces of the external one. The coloring is that of *C. suturalis*, from which the punctate interstices distinguish it.

12. **C. suturalis**, Fabr. (1775), Stäl, l. c.

This name is to be preferred to *pulchra*, under which he described it in 1792; *C. casta*, Rogers, is merely a variety in which the lateral vitta is divided into two.

13. **C. disrupta**, Rogers, l. c.

In this the lateral vittæ are obsolete; a smaller variety occurs in Texas and Colorado with slightly different markings.

D. CALLIGRAPHA, Er.

a. Elytra more or less distinctly striate punctate, resembling *Zygogramma*.

1. Thorax brown.

* Sutural vitta uniform. *similis.*

** Sutural vitta dilated before the apex. *incisa.*

2. Thorax with sides, and from margin yellow. *præcelsis.*

3. Thorax yellow with black marks, form narrow. *elegans.*

b. Elytra striate punctate, thorax brown, last joint of palpi very large. *lunata.*

c. Elytra irregularly variegated.

1. Epipleuræ of prothorax simple, of elytra yellow.

Thorax pale, or with the front margin and angles pale. *multipunctata.*

Thorax green.

First vitta joined to the suture, which is laterally tridentate. *multiguttis.*

First vitta free, suture not green. *Philadelphica.*

2. Epipleuræ of prothorax impressed.

Epipleura of elytra yellow.

First and sutural vittæ confluent.

Black, extreme base of antennæ pale. *sigmoidea.*

Thorax, legs, and antennæ brownish-red. *tortuosa.*

First vitta linear, free, joints 1–4 of antennæ paler. *dislocata.*

Epipleuræ of elytra green.

Sutural vitta trifid in front, legs red. *serpentina.*

Sutural vitta narowed at base, legs black. *sylvia.*

14. C. similis, Rogers, l. c.

Very close to *C. suturalis* in color, but more oblong.

15. C. incisa, Rogers, l. c.

This has the rounded form of the last group, but belongs here by the claws.

16. C. præcelsis, Rogers, l. c.

17. C. elegans, Oliv., Rogers, l. c.

18. C. lunata, Fabr.

This name must be used in preference to *hybrida,* Say; the palpi are unusually dilated.

19. C. multiguttis, Stäl, l. c.

Leconte's name *scalaris* is preoccupied; a fine variety with black legs is called *labyrinthica,* in Leconte's cabinet, but this name is already in use.

20. C. philadelphica, Linn.

I am unable to follow Stäl in separating *C. spireæ,* Say, which appears to me only a slight variety.

21. C. multipunctata, Say.

This species, of which *C. Bigsbyana* and *C. verrucosa* are varieties, appears to me very doubtfully distinct from *C. philadelphica.*

22. **C. dislocata**, Rogers, l. c.

23. **C. sigmoidea**, Lec.

Very near *C. dislocata*, but I have seen nothing intermediate, the markings are much stronger, broader, and more confluent.

24. **C. tortuosa**, Rogers, l. c.

Distinct by its small size and rather rounded form.

25. **C. serpentina**, Rogers, l. c.

Stäl has recorded a variety (*mexicana*) with black legs.

26. **C. sylvia**, Stäl, l. c.

Very distinct by its narrow depressed form, small size (28), and generally unicolorous green surface beneath. Arizona.

[This is the right place to notice a specimen of *C. limbaticollis*, Stäl, said to be from Chicago; it is a Mexican species, allied to *C. sylvia* in form, but reddish-brown instead of green, and the thorax has the margin, sides, and a T-like mark on the disk white.]

E. CHRYSOMELA, Linn.

a. Thorax with the margin broad, not well defined.
- 1. Elytra subsulcate, unicolorous. — *subsulcata.*
- 2. Elytra simple.
  - Elytra margined with fulvous. — *flavomarginata.*
  - Elytra unicolorous. — *basilaris.*

b. Margin of thorax abruptly limited.
- 1. Size large, color golden or purple. — *auripennis.*
- 2. Smaller, uniform æneous.
  - Elytra tolerably shining. — *inornata.*
  - Elytra minutely alutaceous, opaque. — *opacipennis.*

27. **C. subsulcata**, Mannh.

This belongs to a small group of North China species, according to Suffrian.

28. **C. flavomarginata**, Say.

Suffrian gives a few comparative differences between this and the European species, but I doubt their value.

29. **C. basilaris**, Say.

Leconte has united the *vidua* of Rogers and his own *subseriata* under this name; I feel tempted to go further and consider it is a unicolorous form of *C. flavomarginata.*

30. **C. auripennis**, Say.

Very variable in size and color; *C. cribraria*, Rogers, has the punctuation closer and more confused, but is not distinct.

31. **C. inornata**, Rogers, l. c.

32. **C. opacipennis**, Rogers, l. c.

Differs from the last only by the alutaceous surface of the elytra, which is, however, slightly visible in *C. inornata*. Both these species are very near *C. auripennis*.

3. Gastrophysa, Chev.

a. Thorax and legs red.	*polygoni*.
b. Elytra externally golden, suture purple.	*formosa*.
c. Unicolorous green or blue.	
1. Head sulcate, punctuation rough.	*dissimilis*.
2. Head flat, size small, punctuation fine.	*cyanea*.

1. **C. polygoni**, Linn.

2. **C. formosa**, Say.

This is probably the *C. raphnai* of Europe.

3. **C. dissimilis**, Say.

4. **C. cyanea**, Mels.

I cannot separate the Californian *C. cæsia* from this species.

4. Entomoscelis, Chev.

1. **C. Adonidis**, Fab.

Readily known by its opaque fulvous color, the suture and bilateral vittæ black. Hudson's Bay and Utah.

5. Prasocuris, Latr.

A. Elytral vittæ not confluent at the base.	*phellandrii*.
B. Elytral vittæ confluent at base.	
a. Tibiæ pale.	*varipes*.
b. Legs black.	*obliquata*.

1. **P. Phellandrii** (Linn.), Faun. Suec., p. 569.

Illinois (Walsh).

2. **P. varipes** (Lec. MSS.), sp. n.

Elongate, narrow, brassy green, sides of thorax and elytra, and a dorsal stripe on the latter fulvous; base of antennæ, tibiæ, and tarsi pale; thorax sparsely coarsely punctate, elytra deeply striate punctate, interstices smooth, under surface coarsely punctate. L. .15. Middle States, Canada, Lake Superior.

3. **P. obliquata** (Lec. MSS.), sp. n.

Allied to the preceding but broader; thorax more finely punctate; elytra more finely and less regularly punctate striate; dorsal vitta more suddenly oblique at base; legs black. L. 16. Illinois.

Very near *P. hannoverana* of Europe, but with the thorax finely punctate.

6. Phyllodecta, Kirby.

1. **P. vulgatissima** (Linn).

Suffrian (l. c. p. 394) refers specimens received by him to this species, from which they differ markedly in color, being generally purple; *P. interstitialis*, Mannh. appears to be founded on a malformed specimen.

7. Gonioctena, Chevr.

1. **G. arctica**, Mannh.

Of this species I have only seen two specimens from Kenai; it may be known by the black legs and pale tibiæ; Suffrian refers it with doubt to *G. affinis*, but it agrees better with his *G. triandræ* especially according to Thomson's description.

2. **G. pallida** (Linn.).

To this species I refer the *C. rufipes* of Rogers, and the *C. simplex*, Suffr. It is very distinct by the anterior tibiæ hardly dentate, and the sutural angle of the elytra produced.

8. Plagiodera, Chev.

a. Elongate, sides of thorax not thickened, claw joint dentate beneath.
  Unicolorous green. *californica.*
  Thorax red, elytra blue. *arizonæ.*
b. Elongate, sides of thorax thickened.
  Claw-joint not dentate beneath.
    Thorax with the sides yellow, elytra variable. *lapponica.*
    Thorax green, elytra testaceous. *tremulæ.*
  Claw-joint dentate beneath.
    Elytra spotted, or unicolorous green. *scripta.*
    Elytra purple, narrowly margined with yellow. *obsoleta.*
c. Globose, small, striate punctate (*Phædon* Chev.).
  a. Serial punctures fine, hardly stronger than the insterstitial ones, which are numerous and visible. *prasinella.*

b. Punctate striate, interstices nearly smooth.

1. Interstices very finely punctulate, callus visible. *cochleariæ*.
2. Callus well marked, interstices subrugulose. *ovipennis*.
3. Callus none, interstices subrugulose, form convex. *viridis*.

1. **P. californica**, Rogers.

2. **P arizonæ**, sp. n.

Testaceous red, metasternum and elytra blue; antennæ black; joints 1-4 testaceous; head foveolate; thorax very sparingly punctate; elytra coarsely subseriate punctate; scutellum black, smooth. L. .20. Arizona. Extremely near *P. californica*.

3. **P. lapponica** (Linn.).

I cannot separate the avowed specimens of *C. lapponica* from Kenai from the *C. interrupta*, Fab., which occurs nearly all over the States. Dr. Horn has a series from California distinguished by the fine punctuation, subseriate towards the suture; but they do not differ specifically.

4. **P. tremulæ** (Fabr.).

Distinct by its coloration. It is very common in Europe, and has been sent from Hudson's Bay.

5. **P. scripta** (Fabr.) Rogers, l. c.

The *C. confluens*, Rogers, is only a variety of this species, which appears to be very near *P. 20-maculata* of Europe. In the North varieties occur with entirely green elytra, but I have seen intermediate specimens.

6. **P. obsoleta** (Say). Rogers, l. c.

Apparently distinct from the preceding.

7. **P. prasinella** (Lec.).

Oregon (Leconte), the serial punctures are almost lost in this species.

8. **P. cochleariæ** (Syll.).

I refer to this European species two specimens in Dr. Leconte's collection without exact locality.

9. **P. oviformis** (Lec.).

Oregon (Leconte). Near *P. viridis*, but more oval, depressed and with a distinct callus.

10. **P. viridis** (Mels.). Rogers, l. c.

Very variable in color and sculpture. *P. æruginosum*, Suffr.

(l. c. p. 333) seems to me to be a variety with the thorax more finely punctate.

GALERUCIDES.

Tribe *Galerucini.*

The species of this subfamily have been carefully worked out by Dr. Leconte in the Proceedings of the Academy for 1865. Since then, much Californian and other material has accumulated, and I find it necessary to add a few species and rearrange some of the preceding ones.

The only additions since Leconte's paper are *Luperus luteicollis*, *L. varicornis*, *Phyllechthrus nigripennis*, *Diabrotica blandula*, *D. virgifera*, described by Dr. Leconte in the Transactions of the American Entomological Society for 1868, and *Andrector* (g. n.) 6-*punctatus*, by Dr. Horn, in 1872. *Malacosoma*, the two species referred by Dr. Leconte to this genus, appear to me to belong to the *Halticini.*

Phyllecthrus dorsalis (Oliv).

I cannot separate specifically *P. atripennis* (Say), which differs only in color.

Phyllecthrus gentilis, Lec.

P. nigripennis also differs only in color; I do not see that these color variations, however constant, are indicative of more than races; and we are not yet in a position to say much of their constancy even.

Luperus brunneus (Zimm. MSS.), sp. n.

This species has the third joint of the antennæ quite short, as in *P. morulus*; but is much larger than that species and of a shining brown color, less pale; antennæ long, thorax broader than long, with the elytra very finely and sparingly punctulate; upper side convex, rather ventricose. L. .16. North Carolina (Zimmerman).

Luperus morulus, Lec.

The length of this species is printed .4, in error for .14.

Luperus rufipes, Lec.

This name has been in use in Europe since 1787; I have therefore changed it to *L. Lecontii.*

Androlyperus (g. n.).

A. fulvus, sp. n.

Ovate, rather depressed, shining, fulvous; head, scutellum, metasternum, legs, and antennæ black; thorax rather longer than broad, coarctate behind, sides and base margined, disk smooth; elytra impunctate. L. .20. Coast Range, S. of San Francisco (Horn).

♂ First ventral segment deeply foveolate, third and fourth concave, each with a long linear process curving laterally over, 5–6 black, concave; elytra with a small brown spot before the apex, margin deeply plicate and distorted at about $\frac{3}{4}$; antennæ sub-serrate.

This genus, by its general appearance, its antennæ, margined elytra, etc., belongs in the vicinity of *Luperus*; from which it is abundantly distinct by the last joint of the palpi, rather longer than the preceding, acute, and by the prosternum distinctly visible between the coxæ, a character anomalous in the *Galerucini*, though universal in the *Halticini*; the posterior femora are in no way dilated. The remarkable sexual characters have suggested the name employed.

GALERUCA.—The type of Geoffroy's genus was *G. tanaceti*, and *Adimonia* is merely a synonym. I propose to restrict the name *Galeruca* to Leconte's first group, in which the anterior coxal cavities are closed, and the tibiæ setulose. (These characters were first used by Thomson in his Skand. Col.)

Of the five species described, *G. cribrata* appears to me certainly to be a variety of *G. americana*, and *G. bivittata* is somewhat doubtful.

GALERUCELLA, g. n., differs from Galeruca by the open coxal cavities. It may be divided (as Thomson has done) into groups by the relative position of the mesocoxæ, which are distant in *G. nymphææ* and *sagittariæ*, and nearly contiguous in the other species.

Galeruca cavicollis, Lec.

Dr. Zimmerman's specimens were from Massachusetts and not N. Carolina. A further series shows that it is not to be distinguished from *G. hæmatica*.

G. marginella, Kirby.

This certainly is the *G. nymphææ* of Europe; *G. punctipennis* Mannh., also is not, as far as I can see, specifically distinct.

MONOXIA.—The characters derived from the claws appear to me to be certainly sexual; hence, *M. obtusa*, *guttulata*, and *debilis* are not in my opinion separable; the type of *M. angularis* has the angles of the thorax more developed, but that is a character to be used with caution; *M. consputa* is distinct by the black suture, and *M. sordida* by the thick pubescence.

TRIHABDA.—This genus includes *G. viburni*, Payk., and was separated by M. Joannis as a subgenus under the name *Pyrrhalta* in 1866; the species are very hard to define, and the increased material before me leads me to different results from those arrived at by Dr. Leconte. Nevertheless, he does not, I believe, coincide in the views here expressed, preferring to retain these species as distinct.

T. tomentosa, *canadensis*, and *virgata*, I consider as forming one variable species, with black vittæ and black scutellum; *T. flavolimbata* and *T. luteocincta* form another, with blue vittæ, to which may ultimately be added *T. attenuata*; *T. convergens* appears distinct; *T. nitidicollis* and *T. brevicollis* have a more or less white scutellum.

There is still a form brought abundantly from New Mexico by Dr. Lewis, which closely resembles *T. nitidicollis* in form, and the white scutellum, but is much smaller, and the thorax is distinctly punctate. This variety (or species) I propose to name *T. Lewisii*; and it is most interesting on account of the links it affords. The specimens were taken with *T. nitidicollis*, the vittæ vary from metallic green to dull black, and vary slightly in extent.

Tribe *Halticini*.

Prosternum separating the anterior coxæ, elytral epipleuræ reaching the apex, legs saltatorial.

A. Posterior tarsi with the last joint inflated.

B. Elytra striate punctate.

C. Elytra pilose. — *Hypolampsis*.

Cb. Elytra glabrous. — *Pachyonychus*. *Phœdimus*.

Bb. Elytra punctate. — *Hamletia*. *Œdionychis*.

Ab. Posterior tarsi simple.

B. Claws simple or dentate.

C. Anterior coxal cavities open, thorax not margined at base.
D. Antennæ separated at base.
E. Posterior tarsi normal. — *Disonycha.* *Graptodera.* *Orchestris.* *Aphthona.*
Eb. Posterior tarsi with the first joint elongate. *Longitarsus.*
Db. Antennæ almost contiguous. *Dibolia.*
Cb. Anterior coxal cavities closed, elytra generally striate punctate.
D. Antennæ 11-jointed, posterior tarsi normal.
E. Posterior tibiæ simple.
F. Glabrous above.
G. Elytra punctate. — *Haltica.* *Systena.*
Gb. Elytra striate.
H. Thorax impressed at base. *Crepidodera.*
Hb. Thorax with a basal plica. *Balanomorpha.*
Fb. Pubescent. *Epitrix.*
Eb. Posterior tibiæ dentate. — *Euplectroscelis.* *Chætocnema.*
Db. Antennæ 10-jointed, tarsi inserted on the side of the posterior tibiæ. *Psylliodes.*
Bb. Claws bifid. *Blepharida.*

HYPOLAMPSIS, Clark, Cat. Halt., p. 230.

Distinct from the other North American genera by the pubescent surface and striate elytra. Anterior coxal cavities closed.

1. **H. pilosa** (Ill.), Mag., vi. p. 105.

Oblong, brown, reddish beneath, above clothed with long erect dark hairs, and a close griseous rather maculate pubescence; head deeply punctate, antennæ with second joint short, 1–6 pale red, 7–11 black, distinctly thickened; thorax quadrate, rounded in front, sides straight, very closely punctate; scutellum griseous, pubescent; elytra deeply punctate, striate, broader than thorax, sides parallel; body beneath smooth, shining. L. .10–.12. Virginia, Texas, Illinois, Pennsylvania.

2. **H. Clarkii,** Cr., *pilosa* ‡, Clk. l. c., p. 238.

Evidently very distinct; head granulate, ferrugineous, antennæ subincrassate, flavous; thorax transverse fuscous; elytra broad,

globose, punctate, striate, with a thick flavous pubescence concealing the striæ. L. 1 line. Pennsylvania (Chevrolat).

3. **H. Mellyi, sp. n.**

Oblong parallel, clothed throughout with a cinereous pubescence, and with sparse erect pale hairs; antennæ nearly contiguous, long, second joint short, 3–11 elongate, not thickened; thorax subtransverse, faintly constricted towards the base; elytra parallel, punctate striate, punctures hardly distinct. L. .10. Kansas (Melly). Differs from both the preceding by the antemedial depression of the elytra.

PACHYONYCHUS, Chev.

Differs from any of the genera given in Clark's Catalogue by the antennæ with joints 2–3 short, subequal, 4–11 thicker and pubescent; maxillary palpi inflated, posterior tibiæ simple, with one spur.

P. paradoxus (Mels.), Proc. Acad., iii. p. 163.

Oblong, parallel, glabrous, shining, bright ferrugineous, elytra deep brown with the suture ferrugineous; antennæ with joints 4–11 fuscous; head smooth, thorax transverse, sparsely but rather deeply punctate, front and hind angles acute, prominent, base transversely impressed, excavate between the hind angles; scutellum smooth, tip truncate; elytra rather deeply punctate striate, interstices plane, smooth. L. .14–.15. Virginia, Pennsylvania.

This is the first species described by any author under the above generic name, which must thus be kept for it.

Phædromus Waterhousii, Clk., Cat Halt., p. 66, pl. iii. f. 1, is entirely unknown to me, but must be allied to the species just described, from which it differs in having the posterior tibiæ excavate externally, with no terminal spur, maxillary palpi elongate, etc.

It is described as being black, glabrous, shining; thorax yellow, impunctate; sides angulate; elytra punctate-striate, striæ obsolete towards the apex, antennæ black, legs pale. L. 3 lin. South Carolina (Waterhouse).

Pachyonychus || *paradoxus*, Clk., Cat. Halt., p. 61, t. 2, f. 7, is also unknown to me. It differs by having the elytra coarsely and densely punctate throughout, of a dark olive-green color, antennæ with the base and apex pale, legs pale. Philadelphia (Chevrolat).

This name cannot be retained, so I propose to revert to the Dejeanian specific name, *dimidiaticornis*, and to give the genus the name *Hamletia*, in honor of the Rev. Hamlet Clark, who did so much to elucidate this troublesome group of Coleoptera.

ŒDIONYCHIS, Latr.

Distinct from the preceding genera by the open coxal cavities, and by the smooth or simply punctulate elytra.

A. Thorax with the margins reflexed but not produced, explanate; size large.
  B. Thorax impunctate, yellow.
    C. Elytra blue or green.
      D. Elytra opaque, punctulate; thorax unicolorous. *opacior*, sp. n.
      Db. Elytra green, punctate, shining; thorax spotted. *gibbitarsis.*
      Dc. Elytra blue, impunctate; thorax unicolorous. *lustrans*, sp. n.
    Cb. Elytra variegated with white.
      D. Elytra each with four spots; epipleuræ black. 8-*maculatis.*
      Db. Elytra with a pale vitta; epipleuræ pale. *interjectionis.*
  Bb. Thorax punctate.
    C. Epipleuræ black.
      D. Abdomen beneath more or less pale. *abdominalis.*
        E. Thorax yellow spotted with black. *V. scripticollis.*
        Eb. Thorax black margined with yellow.
          F. Elytra punctulate, shining. *V. vians.*
          Fb. Elytra opaque. *V. discicollis.*
        Ec. Thorax black. *V. concinna.*
      Db. Abdomen beneath entirely black, whole insect black.
        E. Opaque. *lugens.*
        Eb. Shining, thorax with hind angles prominent. *violasceus.*
    Cb. Epipleuræ pale.
      D. Elytra blue. *thoracica.*
      Db. Elytra pale with a black vitta. *circumcincta.*

Ab. Thorax with the margins explanate; elytra mostly pallid, size generally small; epipleuræ always pale; antennæ with the third joint nearly glabrous.
  B. Elytra blue, margins narrowly yellow. L. .24. *flavocyanea.*
  Bb. Elytra pale variegated with darker.
    C. Epipleuræ of elytra sinuate.
      D. Intermediate tibiæ simple.
        E. Elytra with two vittæ, one dorsal, one lateral. *petaurista.*

Eb. Elytra with one dorsal vitta. *miniata.*
Db. Intermediate tibiæ angulate externally.
E. Oval, suture broadly black. *thyamoides.*
Eb. Parallel, suture and a dorsal vitta black. *texana.*
Cb. Epipleuræ equally broad.
D. Thorax coarsely punctate; elytra with a plica. *6-maculata.*
Db. Thorax smooth; elytra simple.
E. Short, oblong. *quercata.*
Eb. Elongate, elytra more finely punctate. *scalaris.*

A. Thorax with the sides narrowly reflexed, antennæ with joints 3–11 pubescent, fuscous.

1. **O. opacior**, sp. n.

Elongate, oval, black, opaque, femora and thorax red; head and thorax smooth, this with the sides rounded, reflexed, hind angles obtuse, base rounded not marginated; elytra evidently and closely punctate, posterior femora smooth, tibiæ subexcavate at tip. L. .40. Texas.

2. **O. gibbitarsis**, Say, J. Acad., iv. 83.

Ovate, ferrugineous; antennæ, tibiæ, and tarsi fuscous, elytra brilliant green; head and thorax smooth; this generally with four green discoidal spots placed transversely; hind angles acute, distinct; elytra rather faintly and sparsely punctate; body beneath ferrugineous. L. .28. Kansas, Pennsylvania.

3. **O. lustrans**, sp. n.

Allied to *O. gibbitarsis*, but with impunctate elytra, and much less strongly developed posterior claw-joint; the head, thorax, femora, and body beneath are yellow; the metasternum and a frontal spot being black; the thorax is less transverse, and the hind angles are rather obtuse. L. .28. Texas.

4. **O. 8-maculata**, sp. n.

Subelongate, ochreous-white; antennæ fuscous, basal joints partly pale; head with a frontal spot white, thorax white above and below, formed as in *O. lustrans;* elytra black, impunctate, each with four large white spots, and the humeral angle narrowly white; the spots are one subscutellar, one submarginal before the middle, one pear-shaped near the suture, just behind the middle, one reniform transverse, subapical. L. .24. Texas.

Body beneath pale, four anterior legs fuscous.

5. **O. interjectionis**, sp. n.

Ovate, ochreous-white, body and legs fuscous, posterior femora red; head black with a frontal spot white; thorax white, transverse, hind angles obtuse; scutellum black; elytra brownish-black, the margin and a dorsal vitta ochreous-white (this vitta broad at the apex and sometimes interrupted), surface impunctate, or scarcely visibly punctulate. L. .25. Texas (Leconte).

6. **O. vians**, Ill. Mag., vi. p. 33.

Ovate, black, above olive green, alutaceous; head deeply punctate, thorax transverse, sides nearly straight, hind angles acute, base deeply sinuate behind the angles, ochraceous, sparsely punctate, alutaceous, disk with a broad transverse black spot leaving a narrow ochreous margin; scutellum smooth, black; elytra alutaceous, sparsely punctate; beneath black; posterior tibiæ simple. L. .23. Middle, Southern, and Western States.

v. *scripticollis*, Say, J. Acad., iv. 84.

Somewhat larger, the thoracic spot is less developed, and forms a sinuous band across the thorax. Hudson's Bay, Slave Lake.

v. *discicollis*, Dej.

Very opaque, the elytral punctuation obsolete, thoracic punctuation very deep and coarse. Southern States.

v. *concinna*, Fabr., Syst El., i. 499, 109.

Differs from the type by having the thorax entirely greenish-black. These four very different looking forms appear to me at most races of one species, all agreeing in having the apex of the abdomen testaceous.

7. **O. violaceus**, Lec. Pr. Acad., 1859, p. 137.

Ovate, violet-blue, rather shining; antennæ short, black, head deeply punctate; thorax transverse, sparsely punctate, angles acute; elytra rather closely and distinctly punctate, body beneath black, posterior femora sparingly punctate. L. .25. Fort Tejon (Leconte).

8. **O. lugens**, Lec. Col., Kans., p. 24.

Very similar to the above, from which it differs, being entirely alutaceous; thorax sparingly, elytra not visibly punctate; hind angles of thorax much less prominent. L. .24. New Mexico (Leconte).

9. **O. thoracica** (Fabr.), Syst. El., i. 498.

Broadly ovate, ferrugineous; antennæ, tibiæ, and tarsi fuscous; elytra violet, margin narrowly and epipleuræ ferruginous; thorax transverse, sides nearly straight, angles acute, deeply punctate, disk with seven black dots (four anterior and three immediately posterior and alternate to them); scutellum smooth; elytra closely punctate; anterior tibiæ deeply sulcate externally. L. .30. Southern and Middle States.

10. **O. circumcincta**, sp. n.

Ochreous, antennæ, tibiæ, metasterum black; head deeply punctate; thorax opaque, sides curved, angles moderately prominent, surface sparingly punctate, generally with two oblique discoidal marks black; elytra closely punctate, subrugose, suture and margin very narrowly black, also a broad dorsal vitta black, not reaching the apex. L. .24. Southern States.

Var. Dorsal vitta absent.

B. Thorax more transverse, sides explanate, antennæ with the third joint subglabrous like the second.

11. **O. flavocyanea**, sp. n.

Ovate, ferrugineous, antennæ with joints 4–11 fuscous; thorax ochreous, disk broadly black, sparingly and obsoletely punctate, angles acute; scutellum smooth, black; elytra steel-blue, margin and epipleuræ ochreous, finely and sparingly punctulate, with a few deeper punctures on the callus; posterior femora punctate externally; tibiæ emarginate before the apex. L. .24. Texas (Belfrage).

12. **O. petaurista** (Fabr.), Syst. El. i. 495.

Ovate, ochreous, beneath ferrugineous; antennæ (except the base) and 4 anterior tibiæ fuscous; head ferrugineous deeply punctate; thorax with a variable discal mark blackish, obsoletely punctate; elytra distinctly punctate with the suture, a dorsal and a lateral vitta black; posterior femora punctate externally, tibiæ emarginate. L. .27. Southern States, Texas.

Var. Sutural and dorsal vitta confluent.

Var. Elytra finely punctate.

13. **O. miniata** (Fabr.), Syst. El., i. 495; *fallax*, Mels., Pr. Acad., iii.

Very closely allied to the preceding, but smaller; thorax with the hind angles obtuse, lateral vitta of the elytra absent, and the

dorsal vitta more remote from the suture. L. .24. Middle and Southern States.

14. **O. thyamoides**, sp. n.

Regularly oval, ferrugineous; antennæ fuscous, base pale; head with a few deep punctures near the eyes; thorax scarcely punctulate, opaque, sides rounded, angles acute; scutellum smooth; elytra finely alutaceous, rather closely punctate, external margin broad ochreous; a broad sutural vitta not reaching the apex, black. L. .15–.16. Western States (Leconte).

Differs from the preceding by the intermediate tibiæ angulate externally.

15. **O. texana**, sp. n.

Elongate, subparallel, depressed, head and body beneath black; antennæ at the base, legs, and prosternum ferruginous; head evidently punctate; thorax with the sides nearly straight, smooth, subopaque, ochreous; scutellum black; elytra ochreous, punctate, suture and a dorsal vitta not reaching the apex, black. L. .16. Texas (Belfrage).

Very like a species of *Systena* in form and coloration.

16. **O. 6-maculata** (Ill.), Mag. vi., p. 104.

Oblong, opaque, obscurely ferruginous, above coarsely punctate; thorax and elytra irregularly variegated with brownish-black, these with a distinct plica parallel to the margin. L. .12. Middle States.

This and the following species agree in having the elytral epipleuræ equally broad and not sinuate about the middle as in the others.

17. **O. quercata** (Fab.), Syst. El., i. 495, *limbalis*, Mels., Pr. Acad. iii.

Very like *O. 6-maculata*, but thorax obsoletely punctulate; elytra black, margin pale ochreous, and body beneath black. The elytra also have no submarginal plica. L. .12. Southern and Middle States.

The punctuation of the elytra is variable in strength, and pale varieties occur in which there is only a basal dot and dorsal vitta dark.

18. **O. scalaris**, Mels. Pr. Acad., iii. 163; *lobata*, Lec. Col. Kans., p. 24.

More elongate than the preceding; thorax impunctate; elytra much more sparingly and finely punctate; irregularly variegated with brown. L. .20. Kansas, Pennsylvania.

Disonycha, Chev.

Elytra yellow with black vittæ.
Under surface pubescent.
Thorax short, sides broadly reflexed with a marked callus, head black.
Legs and under side black. *limbicollis.*
Hind femora at least and part of the body red. *V. pallipes.*
Thorax convex, subequal, with four black spots or immaculate; epipleuræ with the outer edge pale.
Metasternum black, a narrow mesial line smooth. *alternata.*
Metasternum red, the mesial surface broadly smooth. *punctigera.*
Epipleuræ black.
Legs and under side black; elytra subcostate. *pennsylvanica.*
Legs and under side red; elytra very smooth, shining. *glabrata.*
Under side glabrous.
Epipleuræ, legs, and under side black, thorax coarsely punctate. *maritima.*
Under side red.
Elytra with the suture and a dorsal vitta black. *abbrevita.*
Elytra with a common broad sutural vitta black. *discoidea.*
Elytra blue or green.
Thorax concolorous, surface opaque, apex of venter yellow. *funerea.*
Thorax yellow.
Head, legs, and under side black, head coarsely punctate. *triangularis.*
Head and under side varied with red, front of head smooth. *collaris.*

The species of this group vary to an inordinate degree, and the determination of true specific limits is one of extreme difficulty. No certain result can be arrived at until long series have been collected from different parts and the plants on which they feed carefully noted. This table is only intended as an approximation.

Graptodera, Chevr.

The species of this genus, from their similarity of coloration, are even more embarrassing than those of the last genus; numerous species have been described, but at different times, so that the characters are not contrasted; and the true specific limits can only be ascertained when we shall have seen series consisting of a dozen of each quasi-species from all parts of the country.

The uniform bluish-green color, transversely impressed thorax, and simply punctate elytra render them readily recognizable.

LONGITARSUS, Chev.

Also easily known, generally, by the elongate first joint of the posterior tarsus and the pale testaceous color; the elytra are punctate, thorax not impressed. The species are beyond my skill to unravel from the incomplete material before me.

BALOPHILA, Foudr. (GLYPTINA, Lec.).

Thorax not margined at the base or impressed; elytra striate, first joint of posterior tarsi tolerably long. Anterior coxal cavities open.

1. B. spuria (Lec.), Col., Kansas, p. 26.

Subovate, shining, above testaceous, beneath darker, legs pale red; head and thorax sparingly punctulate; elytra with the interstices smooth, and a small scutellar stria apparent; punctures tolerably deep, apparent; body black, smooth, shining. L. .6. Kansas, Pennsylvania, North and South Carolina, Maryland.

B. lissotorques (Lec.), is a variety with the thorax almost smooth.

2. B. cerina (Lec.), Pac. R. Rep., p. 68.

More elongate, body pale beneath, thorax testaceous, elytra yellow, obsoletely punctate striate. L. .65. S. Jose (California).

3. B. cyanipennis, sp. n.

Ovate, narrowed in front, black; head, thorax, legs, antennæ, and scutellum red; elytra blue; facial carina rather broad; thorax convex, sides deflexed, rounded; surface sparingly punctate; elytra striate punctate, interstices smooth. L. .6. Texas (Belfrage, 699).

ORCHESTRIS, Kirby. Faun. Bor. Amer. (typ., nemorum.)

Anterior coxal cavities open behind; elytra punctate; thorax not margined at base, second and third joints of antenna equal.

A. Elytra vittate.

1. O. lepidula, Lec., Pac. R. Rep., p. 68.

Subovate, æneous, black, shining; head, thorax, and elytra distinctly and closely punctate; elytra with a narrow uniform

dorsal vitta ochreous, slightly incurved at the apex; base of tibiæ pale. L. .10. California.

♂ Fifth joint of antennæ very large, elongate, quadrate.

2. O. Zimmermanni, sp. n.

Very close to *O. lepidula*, but the elytral vitta is deeply excavate outside, straight at the base and incurved at the apex; base of tibiæ pale. L. .10. Missouri (Riley).

♂ Fifth joint of antennæ very large, elongate quadrate.

3. O. vittata (Fab.), Syst. El., i. p. 469.

Allied to *O. lepidula* but more oval; head smooth; thorax alutaceous, punctate; elytral vitta deeply excavate externally, incurved at base and apex; four anterior legs and base of antennæ yellow. L. .9 Atlantic region.

♂ Fifth joint elongate, not dilated.

4. O. oregonensis, sp. n.

Allied to *O. striolata*, by the shape of the elytral vittæ and the red base to the antennæ, differing by the shining thorax, dark legs (base of tibiæ alone pale). L. .11. Oregon (Horn).

♂ fourth and fifth joints dilated.

B. Elytra each with two pale spots.

5. O. bipustulata (Fab.), Syst. El., i. p. 464.

Ovate, black; base of antennæ and legs entirely pale red; head and thorax finely and sparingly punctulate; elytra sparsely subseriate-punctate, each with two fulvous spots, one large basal, one subapical. L. .10. Middle States.

C. Elytra unicolorous.

6. O. albionica (Lec.).

Bronzed, evidently punctate; antennæ with the first joint black, 2–4 pale; thorax transverse, sides rounded; head punctate, carinate between the antennæ. L. .8. California, Texas.

I cannot satisfactorily separate the Texan specimens of this species.

7. O. Lewisii, sp. n.

Very like *O. albionica*, but entirely bluish-green, more evidently punctate; antennæ with the base entirely red. L. .9. Colorado, Illinois.

8. O. æneicollis, sp. n.

Shape and size of *O. Lewisii*, elytra blue-green, thorax æneous; antennæ very distinctly shorter and stouter than in the preceding; elytra with traces of deeper punctures arranged serially, especially two rows near the suture at the base; tibiæ pale. L. .9. Texas (Belfrage, 874), Middle and Southern States.

Prosternum rugose, sometimes the elytra are less blue and more æneous, and have the whole tibia pale.

9. O. chalybeipennis, sp. n.

Rather like *O. æneicollis* but much larger; above clear blue, beneath black; antennæ, four anterior legs, and posterior tibiæ red; head with an elevated carina between the eyes; vertex sparsely punctulate; thorax alutaceous, punctulate; elytra punctulate, with very evident traces of striæ of larger punctures before the middle; prosternum rugose. L. .11. New Jersey.

APHTHONIA, Chevr.

Thorax not margined at base, coxal cavities open; elytra punctate, first joint of posterior tarsi not elongate.

1. A. picta (Say.), J. Acad., iv. 87.

Ovate, shining, black; head, thorax, antennæ, and legs bright ferrugineous; elytra blue; head with a raised smooth space on the vertex; thorax much broader than long, very sparingly punctate; elytra sparingly and obsoletely punctate. L. .8. Southern States.

2. A. texana, sp. n.

Ovate, not convex; same coloration as the preceding, but closely punctate on the upper surface throughout; elytra with irregular rows of larger punctures. L. .10. Texas (Belfrage, 437).

DIBOLIA, Chevr.

Anterior coxæ not prominent, subtransverse; head deeply sunk in the thorax, vertical; antennæ almost contiguous on the front; elytral epipleuræ very narrow after the first third; posterior tibæ broad, apical spur large and bifid at the extremity.

D. ærea, Mels. Pr. Acad., iii. 167.

Ovate, convex, shining, bluish-green or æneous; legs and an-

tennæ red; thorax with the sides deflexed, slightly rounded, closely punctulate with coarser punctures intermixed; elytra with nine rows of punctures, interstices obsoletely finely punctulate with a few larger punctures. L. .10–.11. Middle and Southern States, Texas.

Var. Ovata, Lec.

Æneous; elytral punctures less marked. California.

Systena, Chevr.

Anterior coxal cavities closed; antennæ with the second joint oval, shorter than the third, which is elongate, equal to the fourth; tarsi short, first joint much shorter than the last; claws ample; thorax finely margined at base; elytra punctate.

A. Thorax and elytra unicolorous, black, or brassy.

1. **S. hudsonias** (Forst.), Nov. Spec. Ins.

Elongate oval, black, anterior legs and joints 3–7 of the antennæ paler; head and thorax obsoletely punctulate, the latter slightly broader than long; sides straight, not narrowed in front, broadly margined; scutellum smooth; elytra rather closely punctulate, evidently margined; under surface smooth, subpubescent. L. .16. Middle and Southern States.

2. **S. frontalis** (Fab.), Syst. El., i. 500.

Very closely resembling the preceding, but the head is entirely red, and the thorax more visibly punctate. L. .16. Middle and Southern States.

♂ Last ventral segment subemarginate with a smooth medial line.

3. **S. subænea**, Lec., Pac. R. Rep., p. 68.

Smaller than *S. hudsonias;* shining, decidedly æneous; legs and antennæ more visibly red; head, thorax, and elytra equally and visibly punctate; thorax broader in front, anterior angles deflexed. L. .14. San José, California.

4. **S. collaris**, sp. n.

Resembles *S. frontalis* in its quadrate thorax; bluish-black, thorax yellowish-red, base of antennæ piceous; head smooth; thorax sparsely, elytra more closely punctate; under side smooth. L. .16–.20. Texas (Belfrage, 878).

B. Elytra with an ochreous vitta, epipleuræ black.

5. **S. elongata** (Fab.), Syst. El. i. 500.

Elongate oval, æneous, head and thorax punctate shining, the latter broader in front; elytra obsoletely punctate, with a narrow dorsal vitta ochreous, not reaching the apex. L. .16. Atlantic region.

6. **S. miles** (Lec.), Pac. R. Rep., p. 68.

Very like *S. frontalis*, but head sparingly punctate; thorax almost smooth; legs pale, head and thorax ochreous, this with the sides black; elytra as in *S. elongata*, but with deeper punctures by the scutellum and along the suture. L. .15. California.

S. ligata (Lec.) is a mature specimen, in which the thorax is much darker and has numerous larger punctures visible.

S. ochracea (Lec.) is entirely immature, but may belong here also.

7. **S. marginalis** (Ill.), Mag., vi. 160; *oblonga* (Lec.), Ann. Lyc., i. 173.

Entirely ochreous, sides of thorax and elytra and elytral epipleuræ black; thorax and elytra rather closely punctate, alutaceous; thorax short, sides nearly straight; posterior angles prominent. L. .14–.16. Southern and Western States.

The eyes are nearer together in this species, so that the frontal space is narrower; the elytral epipleuræ are frequently almost pale; the thorax is often transversely impressed across the base.

C. Elytra with a dorsal vitta, margin, and epipleuræ pale.

8. **S. blanda**, Mels. Pr. Acad., iii. 164.

Ochreous, under side black; thorax short, closely resembling that of *S. miles*, from which it differs in having the elytral epipleuræ pale. L. .14–.16. Atlantic region, New Mexico.

S. bitæniata (Lec.) appears to me to be founded on unusually large and dark individuals of this species.

ORTHALTICA, g. n.

Very distinct by the long antennæ, parallel form, short tarsi, and irregularly striate elytra; the antennæ are closely approximate, the frontal tubercles very distinct; the prosternum rather broad, anterior coxæ distant.

1. **O. copalina** (Fabr.), Syst. El., i. 466. *Forticornis*, Ill. Mag., vi. 3.

Parallel, subelongate, shining, pitchy; head, thorax, antennæ, and legs red; head closely and deeply punctate; thorax trans-

verse, sides slightly rounded, crenulate, disk sparingly punctate, base impressed, impression not limited; elytra confusedly punctate below the scutellum, externally striate punctate. L. .10–.11. Middle and Southern States.

2. **O. recticornis** (Lec.).

Allied to the preceding, but thorax quadrate, sides nearly straight, anterior angles with a seta, disk rather more punctate; elytra regularly striate punctate, scutellar stria well marked; surface pubescent. L. .10. California (Leconte).

LUPERALTICA, g. n.

This genus is established for three small species which have all the facies of a *Luperus*, but by the incrassate femora, entire epipleuræ, separated anterior coxæ, appear to belong to the *Halticidæ*. The form is very much that of *Orthaltica*, but the elytra are much more finely sculptured and not striate; the first joint of the posterior tarsus is elongate; the anterior coxæ are closed behind, but very narrowly, the base of the prosternum being dilated to meet the epimera; antennæ long, basal joint short, claws dentate at the base.

1. **L. fuscula** (Lec.), Pro. Acad., 1865, p. 206.

Fuscous, subopaque; head yellow in front; tubercles well marked, separated from the front which is pitchy; thorax subquadrate, sides rounded in front, hind angles acute, base produced, broadly and faintly trifoveolate, disk obsoletely punctulate; elytra parallel, margin acutely reflexed, with a marginal series of evident punctures; disk obsoletely punctulate. L. .12–.15. Pennsylvania, Illinois, Kansas.

♂ Fifth segment with a broad obtusely truncate appendage.

Var. Novellus (Zimm.). Head, thorax, and legs clear red. South Carolina.

2. **L. senilis** (Say), J. Acad., iv. 87–9. *tincta* (Lec.), l. c., p. 206, 2.

Closely allied to *L. fuscula*, but elytra distinctly punctulate, bluish-green, rest of the body testaceous. L. .12–.15. Illinois.

♂ Fifth ventral segment with a narrow acute process.

HALTICA, Geoff.

Closely allied to *Crepidodera*, but with punctate elytra; thorax transversely impressed and margined at the base.

1. **R. Burgessi**, sp. n.

Black, head, thorax, legs, and antennæ bright red, club of the latter fuscous; elytra bright blue; thorax nearly smooth, convex, sides rounded, elytra irregularly rather shortly punctate. L. .16. Key West, Florida.

CREPIDODERA, Chev.

Distinct by the striate glabrous elytra, and the thorax with a well marked posterior impression terminating in a plica.

1. **C. rufipes** (Linn.), F. S. n. 545. *erythropus*, Mels., Pr. Acad., iii. 165.

Oblong ovate, shining; breast and abdomen black; head, thorax, antennæ, and legs red; elytra blue, punctate, striate; thorax smooth. L. .10. Middle and Southern States. This appears to me certainly identical with the European species.

2. **C. helxines** (Linn.), F. S. n. 540. *nana*, Say, J. Acad., iv. 86. *violacea*, Mells. Pr. Acad., iii. 164. *æreola*, Lec. *opulenta*, Lec.

Oblong ovate, shining, beneath bluish-black, above green, purple, or æneous, legs and antennæ red; thorax sparingly punctate, elytra deeply punctate striate. L. .10. Atlantic region, California.

3. **C. atriventris** (Mels.), l. c., p. 165.

Testaceous red, shortly ovate, ventral segments black; thorax smooth, deeply impressed at the base; elytra not very deeply punctate striate. L. .06. Atlantic region.

4. **C. modesti** (Linn.), F. S. n. 539.

Ovate, very shining, brassy; antennæ and legs pale red; thorax with the base lightly impressed, the terminal plica very deep; punctuation fine and not close, produced in front of the scutellum; elytra strongly punctate striate, striæ subobsolete apically; apical region pale yellow. L. .07–.08. Hudson's Bay.

V. mancula, Lec. Larger, elytra hardly paler at the extremity. L. .9. Oregon (Leconte).

5. **C. scabricula**, sp. n.

Oblong oval, ferruginous red, antennæ with the apex fuscous, elytra violet blue; head smooth, thorax with a very deep basal impression, abruptly limited on either side, broader than long, sides rounded in front, disk with a few scattered deep punctures; scutellum red; elytra deeply punctate striate, the punctures

regular and closely packed, scutellar stria short, interstices smooth. L. .11. Texas (Belfrage, 436). Differs from *C. rufipes* by the red abdomen and strongly punctate elytra.

6. **C.? nana** (Zimm. MSS.), sp. n.

Narrow, ovate, blue-black, antennæ and legs yellowish-red; frontal carina acute, vertex smooth; thorax narrow, broader than long, front angles deflexed, sides rounded in front, base transversely broadly impressed, surface almost smoothly shining; elytra irregularly, conspicuously punctate. L. .06. South Carolina.

Epitrix, Foudr.

Closely allied to *Crepidodera;* thorax impressed at base, impression terminating in a plica, surface pubescent.

1. **E. cucumeris** (Harr.), Ins., p. 103. *seminulum* (Lec.).

Black, clothed with a short erect gray pubescence; antennæ and legs red, posterior femora infuscate; head and thorax shining, that smooth, this sparsely but evidently punctate; elytra punctate striate. L. .06. Middle States. Very destructive to the cucumber vines, according to Harris (l. c.). I cannot separate the Californian example described by Leconte from this species.

2. **E. subcarinata** (Lec.), Pac. R. Rep., p. 68.

Very nearly allied to the preceding, but entirely brassy above, more elongate, thorax more thickly punctate (but still shining), basal impression less distinct. L. .07. San Francisco (Leconte).

3. **E. fuscula** (Zimm. MSS.), sp. n.

Also very near *E. cucumeris*, but broader and equally black; but all the femora are infuscate, and the thorax is coarsely and densely punctate, so as to appear opaque; the basal impression is distinct. L. .65. North and South Carolina (Zimm. n. 5443.)

4. **E. lobata** (Zimm. MSS.), sp. n.

This species is extremely close to *E. fuscula*, of which it has the precise shape; the thorax is not quite so densely punctate, and the legs are entirely red; it also is slightly smaller. South Carolina (Zimm. n. 5675).

5. **E. hirtipennis** (Mels.), Pr. Acad., iii. 165.

Oval, entirely testaceous, body beneath darker, elytra ochreous with a medial ill-defined brown fascia; thorax short, small, shin-

ing, tolerably closely punctate, basal impression faint. L. .6. Middle, Southern, and Western States.

Mantura, Steph.

This genus is distinct by the sculpture of the thorax, which has a deep fovea on either side the base, but no transverse depression. Elytra punctate striate; no scutellar stria; form subcylindrical, front not carinate.

M. floridana, sp. n.

Convex, ovate, reddish-brown, beneath black, legs and antennæ red; head and thorax coarsely punctate, the latter transverse, sides deflexed, hardly rounded, hind angles obtuse; base very deeply foveolate; elytra deeply punctate striate, interstices impunctate, shining, striæ 10, four and five united before the apex. L. .08. Florida, Louisiana, Pennsylvania. The elytra have the apical $\frac{1}{3}$ distinctly paler, as in the European *M. rustica*.

Ceratalтica, g. n.

Antennæ stout, second joint shorter than third, 5–11 stout subquadrate, longer than broad, eleventh suddenly constricted at the apex and acuminate; thorax not margined at the base, impunctate, posterior tarsi short, elytra striate.

1. **C. insolita (Mels.)**, Pr. Acad., iii. 168.

Subquadrate, entirely brownish-red, antennæ fuscous in the middle, the acuminate tip of the eleventh joint black; eyes prominent, frontal keel not elevated; thorax convex, front angles deflexed, sides rounded, hind angles prominent, much narrower than the elytra, which are very finely striate punctate, interstices extremely finely punctulate. L. .065. Southern States.

Chætocnema, Steph.

Easily recognized by the blue or æneous surface and pale tibiæ; the posterior tibiæ are dentate externally, being deeply sulcate for the tarsi.

A. Striæ irregular near the suture, eyes large, antennæ rather distant.

1. **C. irregularis, Lec.**

Brassy or bluish, oval, convex, opaque, minutely alutaceous;

thorax strongly punctate, medial line evident only at the base; elytra irregularly evidently punctate striate, insterstices smooth. L. .07–.08. S. José (California), Oregon.

B. Striæ regular, interstices impunctate.

2. **C. subviridis**, Lec.

Oval, greenish-blue, antennæ long, red, apex infuscate, tibiæ red; head smooth, thorax short, coarsely punctate, elytra punctate striate, punctures closely packed, interstices punctulate. L. .08–.09. Kansas (Leconte).

3. **C. denticulata** (Ill.), Mag., vi 163.

Oval, brassy, in anterior legs, hind tibiæ, and antennæ (apex infuscate) red; surface alutaceous, head obsoletely, thorax evidently punctate; elytra rather deeply punctate striate. L. .08–.09. North and South Carolina, Maryland, Kansas, Pennsylvania, Texas. The Texan specimens are smaller, narrower, and possibly distinct. (No. 869, Belfr.)

4. **C. crenulata**, sp. n.

Ovate, brassy, antennæ and four anterior legs red; head and thorax alutaceous, that smooth, this deeply but sparingly punctate; elytra deeply punctate and striate; punctures large, interstices crenulate. L. .06. North Carolina (Zimm. 5441).

5. **C. alutacea**, sp. n.

Subcylindrical, bluish-black, antennæ red; surface alutaceous; head smooth, thorax coarsely, tolerably closely punctate; elytra deeply punctate striate; scutellar stria rather long. L. .065. Florida (Leconte).

6. **C. parcepunctata**, sp. n.

Broadly ovate, brassy, four anterior legs, posterior tibiæ, and antennæ red; head and thorax alutaceous, that smooth, this finely and sparsely punctulate, with a line of deeper punctures along the base; elytra deeply punctate striate, shining. L. .06. Pennsylvania, Lake Superior.

7. **C. texana**, sp. n.

Ovate, tibiæ, tarsi, and antennæ red, surface alutaceous, brassy; head very obsoletely, thorax obsoletely but closely punctulate; elytra punctate-striate, striæ hardly impressed. L. .08. Texas (Belfr. n. 435).

8. **C. confinis**, sp. n.

Ovate, brassy, antennæ, four anterior legs, and posterior tibiæ red; surface alutaceous, head smooth, thorax closely but lightly punctate, elytra not very deeply striate. L. .055–.06. North and South Carolina (Zimm. n. 5027).

Very like *C. texana*, but about half the size.

9. **C. pulicaria** (Mels.), Proc. Acad. iii. 167 (*fide* Zimm).

Rather narrowly oval, brassy, base of antennæ, four anterior legs, and posterior tibiæ red, surface alutaceous, head and thorax opaque, this very obsoletely punctulate with deeper punctures along the base; elytra clearly punctate, striate, shining. L. .06. North Carolina (Zimm. n. 5440), Texas (Belfr. n. 702).

10. **C. elongatula**, sp. n.

Elongate oval, narrow, pointed, black shining, legs and antennæ ferrugineous; head and thorax alutaceous, very sparsely punctulate, this transverse, side straight; elytra clearly punctate striate scutellar striæ reaching the middle. L. .06.

Very unlike the other members of the genus by its depressed form like *orchestris*, the intermediate tibiæ are dentate as well as the posterior. Colorado (Lewis).

EUPLECTROSCELIS, g. n.

Allied to *Chætocnema*, but distinct by the posterior tibiæ sulcate throughout. The clypeus is strongly reflexed and thickened in front, the antennæ not very approximate, long, 2d joint quite short; thorax not impressed, elytra confusedly striate; posterior tibiæ distinctly sulcate throughout, the sides ciliated, and the external edge with a tooth before the apex. I have been obliged to form this genus for a Lower California species, which has much the appearance of a *Eumolpide*.

1. **E. xanti**, sp. n.

Oblong ovate, ochreous, tinged with purple, tibiæ and tarsi brown; head punctate on either side, disk smooth, shining, eyes large, thorax transverse, not emarginate in front, sides straight, base margined, disk unequal, sparingly punctate; scutellum smooth, shining; elytra thickly and closely substriate punctate; clothed beneath with a short gray pubescence (as in *Disonycha*). L. .24–.25. Lower California (Xantus).

♂ First joint of four anterior tarsi broadly dilated.

Psylliodes, Latr.

Easily known by the 10-jointed antennæ, striate elytra with punctate interstices, and the posterior tarsi inserted on the side of the tibiæ. The species are very difficult to distinguish. *P. interstitialis* and *P. convexior*, Lec., appear to me to be identical; and *P. parvicollis*, Lec., seems to me to be *P. punctulata*, Mels.

Blepharida, Chevr.

1. **B. rhois (Forst.), Cent. Ins. i. 21.**

This species is carefully described by Mr. Rogers in his paper on *Chrysomelidæ* in the Proceedings for 1856 (p. 29). I cannot, however, consider it as belonging to that sub-family, and no course remains but to place it as a separate group of *Halticini* distinguished by its bifid claws.

CASSIDIDES.

The number of species here enumerated is eighteen, of which two are unknown to me; but several other species have been attributed to North America by the earlier authors, and Mannerheim (Bull. Mosc. 1853) records the European *C. nobilis*, Linn., as occurring in Russian America. Two species of *Mesomphalia* have been said to occur on the Mexican boundary, but are very doubtful. They are easily recognized by the coloration, which is green with large red blotches.

The other genera are thus arranged by Boheman, in his monograph of the group; to which reference should be made for detailed descriptions.

A. Head prominent, visible. *Porphyraspis.*
B. Head partially prominent, prosternum produced in front. *Chelymorpha.*
C. Head concealed, prosternum not produced.
  a. Thorax with the margins thickened. *Physonota.*
  b. Thorax transverse, angles rounded, margin simple.
    1. Antennæ short. *Cassida.*
    2. Antennæ longer than the thorax. *Coptocycla.*

Porphyraspis, Boh.

P. cyanea (Say), Boh. Mon. i. 97.

Hemispherical, very coarsely foveolate; above light blue. Antennæ testaceous. L. .20. Southern States.

Chelymorpha, Chev.

1. **C. cassidea** (Fab. 1775). *cribraria* (Fab.), Boh. Mon. i.

Oval oblong, bright red, body beneath and legs black; thorax with four black dots placed transversely; elytra with a common sutural spot below the scutellum, and each with six dots black. L. .38–.46. Atlantic Region.

Var. Thorax with six spots black.

Var. Legs more or less red.

2. **C. Lewisii**, sp. nov.

Very similar to the above, but much paler; thorax with two or four spots (in the former case, body pale beneath; in the latter, dark); prosternum with the groove not extending in front of the coxæ. (In *C. cassidea* it goes the whole length.) L. .42. New Mexico (Leconte).

3. **C. phytophagica**, sp. nov.

Again very near *C. cassidea;* thorax smaller, more shining, more sparingly and strongly punctate; elytra more coarsely and visibly punctate. L. .40. Arizona (Leconte).

Physonota, Boh.

1. **P. unipunctata** (Say), J. Acad., iii. 434. *Helianthi* (Rand.), Bost. J. ii. p. 30 Boh. Mon. i.

Oval, convex, pale yellowish-ochreous; thorax with three black dots, one discoidal sub-elongate, one on either side nearer the base; antennæ black, base pale. L. .38–.46. Atlantic Region.

C. 5-punctata, Walsh, does not differ from this species.

Cassida, Linn.

1. **C. nigripes**, Oliv. E. M., v. 348. Boh. Mon. ii. 362, 29.

Brownish-red above, black beneath, antennæ with joints 1–7 red; elytra rather deeply punctate striate, margin not widely explanate, edge thickened, each with three rather obsolete black spots, one before the middle in the fourth and fifth interstices, one under the callus, and one behind the middle, both in the eighth and ninth interstices. L. .20–30.

Legs black, or at most the tibiæ pale. (*9-maculata*, Mann. Boh.)

(3. Legs entire pale. *ellipsis*, Lec.)

Ranges across the continent.

2. **C. bivittata**, Say. *striolata*, Boh. l. c. ii. 444. *vittula*, Boh. l. c.

Shortly ovate, convex, yellowish-red, black beneath, antennæ with six joints red; legs brownish-red; elytra with the sides not explanate, deeply punctate striate, a line of sub-marginal coarse punctures; each with the suture and two vittæ deep brown. L..19. Middle and Southern States, Illinois.

3. **C. thoracica** (Ill.), Boh. Mon. ii. 376, 41.

Oblong ovate, green, thorax and scutellar region reddish; beneath black, sides of abdomen narrowly paler; basal half of femora black; elytra confusedly punctate. L. .28. Illinois.

4. **C. texana**, sp. n.

Oblong ovate, sides sub-parallel, last three joints of antennæ black, the rest pale ochreous, shining; thorax with the angles rounded; elytra with the humeral angles prominent, margins tolerably broad, with nine striæ of very deep coarse punctures. L. .22. Texas (Belfrage).

5. **C. callosa**, Boh. Mon. ii. p. 471.

Elytra irregularly tuberculate, and gibbous, dark brown; margin with two yellow patches, one medial, one sub-apical; thorax with base largely brown. L. .20. Texas (Sallé).

Closely resembling *Copt. clavata*, but a true *Cassida*.

Coptocycla, Chev.

1. **C. aurichalcea** (Fab.), Boh. Mon. iii. p. 142.

Above shining, finely seriate punctate, golden, after death testaceous, body beneath and last four joints of antennæ black. L. .23.

Var. Femora with the base infuscate.

Middle, Western, and Southern States.

C. aurisplendens, Boh., is only a pale form of this.

2. **C. Arizonæ**, sp. n.

Above reddish, with a large lateral hyaline triangular patch, well defined posteriorly; body beneath and four last joints of antennæ black. L. .23. Arizona (Leconte).

3. **C. guttata** (Oliv.), Boh. Mon. iii. p. 314.

Testaceous above, base of thorax, disk, and base of elytra dark; body beneath black, sides broadly red; last two joints of antennæ black. L. .23. Atlantic region.

Paler varieties have the dorsal mark less developed, and are described by Boheman as *C. trabeata* and *C. lucidula.*

4. **C. purpurata,** Boh. Mon. iii. p. 300.

Above brownish-red, with a lateral triangular hyaline patch, body beneath black, antennæ and legs pale. L. .23. Kansas, Pennsylvania.

5. **C. Leconti,** sp. nov.

Differs from the others by its more oval, depressed form, recalling that of *Cassida;* the antennæ are however long, the last two joints black; body beneath pale; thorax with an M-like mark at the base; elytra with the disk black, variegated with fulvous, humeral angles black at the point. L. .24. Arizona (Leconte).

6. **C. clavata** (Fabr.) Boh. Mon. iii. p. 391.

Pale testaceous, elytra brown, tuberculate, gibbous, margin with a large oblong hyaline spot in the middle, and a small subapical one; antennæ with the last joint dark. L. .30. Southern States.

7. **C. bisignata,** Boh. Mon. iii. p. 119.

Ovate, rufo-ferruginous, body beneath and last four joints of antennæ black; elytra deeply punctate striate, disk with a round black dot. L. .29. "America borealis." This species is unknown to me.

8. **C. plicata,** Boh. Mon. iii. p. 493.

Easily distinguished by the claws pectinate at the base; body beneath pale, last joint of antennæ black, elytra with the disk black, and a well-marked foveole on each. L. .28. North America. I have not seen this.

[A large species from Mexico and Texas has the elytra acutely gibbous, and is probably described in Boheman; it has been received from Europe with the MS. name *lucida.*]

HISPIDES.

The species of this group are but few in number (19), but their synonymy is somewhat confused, and their descriptions do not exist in any accessible works. I have therefore made the following brief diagnoses to enable the student to name his species, leaving full descriptions for a time when the whole family of *Chrysomelidæ* shall undergo revision.

Antennæ 11-jointed.
  Elytra finely seriate-punctate, interstices not costate. *Stenispa.*
  Elytra punctate-striate, alternate interstices costate. *Odontota.*
Antennæ 8-jointed, joints 9-11 connate. *Microrhopala.*

STENISPA.

1. **S. metallica** (Fab.), Baly, Cat. Hisp. p. 13; *brevicollis* (Rand.) Bost. J. ii. p. 48. [Languria !]

Elongate, linear, æneous; antennæ black; thorax very finely and sparingly punctulate. L. .23. Middle States.

2. **S. collaris**, Baly.

Very similar to the preceding but longer, thorax entirely red, elytra more finely punctate. L. .25. Indian Territory (Horn).

ODONTOTA, Chev.

A. Elytra 10-striate, interstices costate; at least at base and apex.
  2d and 3d interstices not costate. *omogera.*
  3d interstice not costate.
    3d and 4th pairs of stria regular.
      Sides of thorax and humeral angles of elytra orange. *scapularis.*
      Thorax red, disk and elytra black. *notata.*
      Thorax and elytra red, suture black. *Harrisii.*
    3d and 4th pairs of stria confluent in the middle. *bicolor.*
  3d interstice costate at base and apex, elytra dilated behind. *quadrata.*
B. Elytra 8-striate.
  Elytra broad, subtruncate, pale, varied with fuscous. *rosea.*
  Elytra narrow linear, black, or metallic.
    Thorax longer than broad.
      Entirely black or greenish-black. *nigrita.*
      Thorax red, front and hind margin black. *Ariadne.*
    Thorax transverse, red, front and hind margin black. *Lecontii.*

1. **O. omogera**, sp. n.

Elongate, black, dilated behind, sides of thorax and humeral angles of elytra red; antennæ with the 3d joint elongate; elytra regularly and deeply punctate striate; 2d and 8th interstices costate; apical margin deeply and unequally acutely dentate. L. .31. Tampico (Mexico).

2. **O. scapularis**, Ol. Ent. vi. 766, pl. 1, 13; *lateralis*, Say, J. Acad., iii. 431.

Black, sides of thorax and humeral angles of elytra red, the latter broad; apex rounded, serrate, deeply striate punctate, alternate

interstices costate. L. .22–.26. Middle and Western States, Arizona, New Mexico.

3. **O. notata,** Ol. l. c. t. 2, f. 26.

Black, thorax red, with the disk black; form of *O. scapularis*, but elytra less acutely costate; less visible serrate at apex. L. .24. Southern States.

4. **O. scutellaris** (Ol.), l. c. f. 21. *suturalis* ‡ Harr. Ins. p. 98.

Rather broad parallel, black, thorax and elytra red; the latter with the suture black; the color dilating behind. L. .24. Middle and Southern States.

Var. Suture narrowly black, color broadest in front.

5. **O. bicolor** (Ol.), l. c. f. 27. *Bacchus*, Newm. Ent. 76.

Black, elongate, parallel, thorax, scutellum, and under side red; elytra acutely costate. L. .25. Georgia, Illinois.

6. **O. Walshii,** sp. n.

Elongate, parallel, black, thorax red above; head smooth above, deeply foveate between the eyes, antennæ rather shorter than *O. bicolor*, 3d joint elongate, nearly equal to the two following; thorax transverse, sides rounded, hardly narrowed in front; deeply punctate; elytra with ten uniform rows of deep approximate punctures, the 8th interstice only carinate; beneath opaque, metasternum shining. L. .14. Illinois (Entomological Society).

7. **O. rubra** (Web.), Obs. p. 66. *quadrata* (Fab.), Syst. El. ii. 60.

Rose red, accuminate in front, elytra dilate, and obtusely punctate behind; metasternum and middle of ventral segments black; elytra acutely costate; the 3d costa visible at base and apex only. L. .20. Texas, California, Middle States.

8. **O. rosea** (Web.), Obs. Ent. p. 66; *inæqualis* (Web.), l. c. *obsoleta* (Say) J. Acad. iii. 432; *pallida* (Say) l. c., *suturalis* (Fab.) Syst. El. ii. 63. *Philemon* (Newm.) E. M. v. 390; *Baucis* (Newm.) l. c. *flavipes*, Germ. sp., Nov. 529.

Black, elytra elongate quadrate, finely serrate; legs pale, thorax and elytra marked irregularly with fuscous, the latter acutely costate. L. .15. Canada, Middle and Southern States, Texas.

Var. Body beneath pale red.

9. **O. nigrita** (Oliv.), l. c. f. 35, Baly, Tr. Ent. Soc. Lond. ii. 251.

Narrow, linear, black, or subæneous; elytra parallel, acutely costate; thorax longer than broad, coarsely punctate. L. .15–.16. Southern States.

Specimens from Florida in Dr. Horn's collection are dull-black, those from Georgia æneous, and two from New Mexico greenish-blue; but I can see no other differences.

10. **O. Ariadne** (Newm.), Ent., i. 77, Baly l. c.

Black, thorax red, front and hind margins black; thorax coarsely punctate. L. .175. S. Carolina (Zimmerman).

11. **O. Lecontii** (Baly), l. c.

Very like *O. Ariadne* in color, but larger; thorax transverse, form less cylindrical; thorax with the base transversely sulcate; disk with a raised vitta. L. .2½ lin. Unknown to me.

These three species form the genus *Charistena* of Baly.

Microrhopala, Chev.

Elytra 8-striate, alternate interstices costate.	
Above more or less marked with red.	
Punctures of the elytra lightly impressed, second costa and often the thorax red.	*vittata.*
Punctures deep and regular, second costa red.	
Under side black.	*Xerene.*
Under side steel-blue.	*rubrolineata.*
Above unicolorous.	
Punctures regular.	*cyanea.*
Punctures very coarse, subconfluent.	*excavata.*
Elytra 10-striate in the apical part, black.	*porcata.*
Elytra regularly 10-striate, pale above.	*Melsheimeri.*
Elytra irregularly plicate and tuberculate.	*plicatula.*

1. **M. vittata** (Fabr.), Syst. El., ii. 64.

Bluish-black, somewhat ovate; elytra faintly costate, punctures lightly impressed, second costa more or less red. L. .23. Middle and Western States, Oregon.

Var. lætula, Lec., thorax red; elytral costa clearly red.

2. **M. Xerene** (Newm.), Ent. Mag., v. 390.

Black, sides of thorax, second elytral costa and apex of first red; punctures of the striæ deep and regular; costa but little elevated. L. .16–.17. Middle and Southern States.

Var. interrupta, Coup. Can. Nat. (2), ii. 63, second costa interrupted by red.

3. **M. rubrolineata** (Mannh.), Beitrag. p. 307.

This seems to me to differ only in having the under side blue. California.

Var. signaticollis, Lec., Elytra unicolorous.

4. **M. cyanea** (Say), J. Acad., iii. 433; *Hecate*, Newm. Ent., p. 77.

In shape like *M. vittata*, but entirely unicolorous, bluish or brassy-black; elytral punctures deep and regular; interstices not elevated; last ventral segment red on each side. L. .22–.24. Middle and Western States, Colorado.

5. **M. excavata** (Oliv.), l. c. f. 29; *Erebus* (Newm.), l. c.; *Pluto* (Newm.), l. c.

Smaller than the preceding, similarly unicolorous; alternate interstices elevated, punctures very large subconfluent; under side unicolorous.

6. **M. porcata** (Mels.), Pr. Acad., iii. 161.

Entirely dull black, rather parallel; antennæ short; thorax coarsely punctate; elytra with the alternate interstices costate; the third pair of striæ confused throughout their length, forming two distinct pairs at their apex. L. .12.–.13 Pennsylvania, Illinois.

7. **M. Melsheimeri**, sp. n.

Short, subquadrate, antennæ very short; coloration precisely that of *A. rosea;* elytra 10-striate; alternate interstices acutely costate. L. .13. Pennsylvania.

8. **M. plicatula** (Fab.), Syst. El., ii. 63.

Black, front of thorax, scutellum, base of femora, and of antennæ orange; surface rugulose and plicate in every direction, as in *Chlamys*. L. .20. Southern States.

NOTES ON THE SPECIES OF BUPRESTIDÆ FOUND IN THE UNITED STATES.

BY G. R. CROTCH, M.A., CANTAB.

Since the revision of this family, by Dr. Leconte, appeared in 1859, considerable changes have become necessary, both by the accretion of new material, and by the more exact determination of Gory's species. Dr. Leconte took with him on his recent visit to Europe types of all his species; these were carefully compared by himself and others, so that we now have a probably accurate idea of the species that Gory intended to represent. This synonymy has been embodied in the present paper, together with the results of a detailed examination of all the species by myself; which has resulted in the suppression of a certain number as races or even mere varieties. In this I shall probably not be followed by some, and if structural characters that I have overlooked can be pointed out, I shall gladly reverse my decision. The species of *Dicerca* and *Agrilus*, two of the most troublesome genera, have been tabulated out; but it has proved impracticable to construct a similar table for *Chrysobothris* or *Acmæodera*. A certain number of new species have been described from the cabinets of Drs. Leconte and Horn, but the subject is far from being exhausted.

CHALCOPHORA. *C. lacustris*, Lec., seems to me to be no doubt a variety of *C. virginiensis*, from which *C. angulicollis* can only be separated as a race. Similarly the two species formed from *C. liberta* do not appear to me to be entitled to specific rank, having in consideration the great changes liable to occur in sculpture in this family.

C. langeri is certainly only *C. campestris*.

PSILOPTERA. *P. Webbii* has been identified with *P. Drummondi*, Gory; and I cannot see that *P. Woodhousii* differs in any tangible manner from it.

DICERCA.

1. **D. prolongata**, Lec. l. c. p. 194.

This agrees well with the description of *Stenura tenebrica*, Kirby.

It differs from *D. divaricata* by the darker color, and the

deeper channel on the thorax; the ♂ also has the emargination of the last segment partly filled up with an obtuse tooth.

2. **D. divaricata** (Say), Lec. p. 195.

3. **D. caudata**, Lec. l. c.

I cannot see that this is anything but a smaller, less developed form of the last.

4. **D. pugionata** (Germ.), Lec. l. c. p. 196.

Very distinct by the bidentate elytra; the ♂ has the last segment emarginate with a central tooth.

5. **D. mutica**, Lec. l. c.

Distinct from any other species by the convex prosternum; the unique ♂ has the last segment with a broad emargination.

6. **D. obscura** (Fab.), Lec. l. c.

7. **D. baltimorensis** (Hbst.), Lec. l. c. p. 197.

This species is founded on a single ♂ which I cannot distinguish from *D. obscura*. The straight sides of the thorax are peculiar to the ♂.

8. **D. soror**, Lec. l. c.

Based on a single ♀, *D. obscura*.

9. **D. lurida** (Fab.), Lec. l. c.

After attentively examining about fifty specimens, I cannot separate this species from *D. obscura*. No character of sculpture is of any importance, and the sexual characters vary within certain limits; thus the emargination in the ♂ has sometimes a short central tooth, and at others is simple, and the ♀ has an acute or truncate tooth in the middle.

10. **D. lepida**, Lec. l. c. p. 198.

Closely allied to *D. obscura*, from which it differs by having the thorax channelled, and the elytra with smooth reliefs.

11. **D. spreta**, ‡ Lec. l. c. p. 198.

This is Gory's *asperata*, according to the types in Mniszech's collection. It has simple ♂ tibiæ, as in *D. lepida*, but differs by the short thorax.

12. **D. asperata**, ‡ Lec. l. c. p. 199.

This is the *D. spreta*, Gory, according to the types. The male intermediate tibiæ are dentate.

13. **D. tenebrosa** (Kirby), Lec. l. c.

This is certainly Kirby's species, although Saunders refers it to *distinguenda*, Lap.; Kirby describes the apex of the abdomen as tridentate, which is not applicable to *D. lacustris*, which Saunders has united with it.

The male intermediate tibiæ are dentate.

14 **D. hilaris**, Lec. l. c. p. 200.

This belongs to the section with the abdomen rounded in the female, and is in fact the ♀ of *D. manca*.

15. **D. lugubris**, Lec. l. c.

Founded on a single ♂; the ♀ has the abdomen rounded, and *D. lacustris*, Lec.

16. **D. chrysea** (Mels.), Lec. l. c.

The ♂ has dentate intermediate tibiæ, and does not differ from *D. tenebrosa* except in color; so that I regard it as a bright southern form.

17. **D. punctulata** (Schh.), Lec. l. c. p. 201.

Distinct by the longer thorax, and elytra with rows of punctures.

18. **D. manca**, Lec. l. c.

This is very close to *D. tuberculata*, but is generally greener; the thorax is not dilated in front, and the elytra are less uneven.

19. **D. tuberculata**, Lap., Lec. l. c.

20. **D. lacustris**, Lec. l. c. p. 202.

This is the ♀ of *D. lugubris*, Lec.

21. **D. bifoveata**, Lec. l. c.

This is a small female of *D. tenebrosa*.

22. **D. crassicollis**, Lec. l. c.

The so-called male is a new species, the ♀ is *D. tenebrosa*.

23. **D. pectorosa**, Lec. l. c. p. 203.

24. **D. Hornii**, sp. n.

Oblong, posteriorly acuminate, cupreous or dull æneous; head rugose; thorax broader than long, sides strongly rounded; middle channelled, the ridges more or less smooth, only slightly elevated, sides not uneven; elytra even, subrugose, with four im-

pressed striæ parallel to the suture, the sides irregularly rugulose, apex produced, suture mucronate. L. .70. California.

♂ intermediate tibiæ with a long narrow tooth near the base, above serrate; last segment with a broad truncate emargination.

♀ Apex of last segment rounded.

♀ Var. apex of last segment tridentate.

25. D. sexualis, sp. n.

Very closely allied to *D. tenebrosa*, but the male has the intermediate tibiæ simple, and the prosternum hairy; the female has the apex of the abdomen rounded; the elytral reliefs are higher, smoother, and longer, so that the appearance is different. L. .68. California, Oregon.

From *D. lugubris* which it resembles in the ♀, the strong sculpture at once separates it.

26. D. californica, sp. n.

So closely allied to *D. tenebrosa*, that I can only separate the ♂s, which have the tibiæ simple, and the prosternum not pilose. L. .65. California.

Dicerca Lecontii, Gory, unknown formerly to Leconte, will now come in the new genus *Trachykele*, Mars., which is based on *T. Blondèli* [Abeille ii. 150] found at Paris, but which appears to be N. American. The elytra of this species are now before me, and do not present extreme differences from those of *T. Lecontii*, of which it may be a large specimen.

Dicerca, Esch.

A. Body elongate, elytra produced at tip into a prolonged mucro; intermediate tibiæ of ♂ dentate.

B. Elytral mucro simple.

C. Thorax with two evident discoidal ridges. *prolongata.*

Cc. Thorax with scarcely visible ridges, brilliant æneous. *divaricata.*

Bb. Elytral mucro bidentate. *pugionata.*

Aa. Apex of elytra not much produced, bidentate.

B. Thorax and elytra uniform without elevated smooth ridges. *obscura.*

Bb. Thorax and elytra uneven.

C. ♂ intermediate tibiæ dentate, front carinate. *spreta*, Lap.

Cc. ♂ tibiæ simple.

D. Thorax broader than long, dilated in front. *asperata*, Lap.

Dd. Thorax longer than broad. *lepida.*

Aaa. Apex of elytra not produced, entire.
B. Last ventral segment not bicostate.
C. ♀ last segment tridentate.
D. ♂ intermediate tibiæ dentate. *tenebrosa.*
Dd. ♂ tibiæ simple. *californica.*
Cc. ♀ last segment rounded.
D. Elytra irregularly tuberculate.
E. Greenish, thorax not very uneven. *hilaris.*
Es. æneous, thorax dilated in front strongly costate. *tuberculata.*
Dd. Elytra with traces of rows of punctures.
E. Thorax hardly dilated, discoidal costæ straight, approximate. *punctulata.*
Es. Thorax dilated in front, costæ more distinct. *lugubris.* *sexualis.*
Bb. Last ventral segment bicostate, ♂ apex truncate. *pectorosa.*
Aa. Apex of elytra slightly produced, sutural angle mucronate.
* Prosternum sulcate. *Hornii.*
** Prosternum convex. *mutica.*

Poecilonota. *P. erecta*, Gory, is merely *P. cyanipes*, Say.

Buprestis. Linnæus' name should be kept for this division of the genus containing *A. rustica.*

B. fasciata, *6-plagiata*, and *Langii* should be placed in the second group with the ♂ tibiæ simple, and in my opinion must form one species; at any rate *B. fasciata* and *B. 6-plagiata* are sexes, while *B. Langii* differs a little in general form, but in no definite way. Leconte's group above is most troublesome, and further observations are still necessary to settle the species. In *B. lineata* and *B. consularis* the prosternum is more or less yellow, and the elytra bidentate and in the others truncate; *B. læviventris* has a less strongly punctate abdomen, though I do not lay great stress on this; *B. alternans=Nuttalli;* and all the immaculate species certainly seem to me to form one species under the name *B. maculiventris*, Say. The species allied to *B. striata* are equally unsatisfactory. *B. radians=lauta* ♂, which is known from *B. striata* by the smooth costæ; but all transitions occur between costate and striate examples, as in *B. maculiventris.* *B. adjecta* seems to occur with the elytra truncate also, and one or two new intermediate species exist in cabinet.

Cinyra erythopa is recognized as exotic.

Xenorhipis Brendeli, Lec., will have to be added here.

Melanophila opaca is, I consider, a unicolorous specimen of *M. notata*.

M. Drummondi and *M. fulvosignata* are usually very distinct, but some specimens from Michigan are very intermediate in sculpture.

M. prasina, Lec.

This name being preoccupied is changed by Leconte in the "List" to *M. gentilis*.

ANTHAXIA.

After carefully comparing all the six species of Leconte's group A., I am unable to separate any of them specifically; the glabrous head of *A. inornata* is merely individual, and probably abraded.

The sexual differences are very slight, and consist merely of a more concave prosternum in the male.

A. subænea, Lec. l. c. p. 216.

This I take to be the ♀ of *A. viridifrons*, Gory.

A. quercata (Fab.), Lec. l. c. p. 217.

This in like manner is the ♀ *A. cuneiformis*, Gory.

POLYCESTA.

P. elata, *cavata*, *californica*, and *obtusa* appear to form one variable species; *P. obtusa* is indeed a very small, probably abnormal specimen. *P. velasco* is very distinct by its short subscutellar costa.

Ptosima, gibbicollis, Say (*luctuosa* auct.).

Say's name not being now preoccupied, it must be employed for this species.

ACMÆODERA.

Several new species have been added to the list, and four or five remain undescribed, but I am entirely unable to discover any characters except the variable ones of color, sculpture, and form; so that the limits of species appear to be merely opinionative.

Leconte's groups based on the abdominal crest are not very safe, certainly *A. texana* has a well-marked crest, and must come next to *A. pulchella*, of which it is hardly more than a variety.

A. culta [*tubulus*, Fab.], *A. subbalteata*, and *A. bivittata*, Horn, are distinct by the very short setose white erect pubescence; *A. gibbula* is very distinct by the prosternum produced and truncate in front; this is also somewhat the case with *A. comata; A. guttifera* is also very distinct by the last three segments of the abdomen being closely and densely punctate.

Chrysobothris.

This genus, no less than the last, is a trouble to students, but here the sexual characters may be brought in satisfactorily. *C. soror*, *Leseuri*, *obscura*, *semisculpta*, and *misella* seem to me all referable to the protean *C. femorata*. *C. calcarata*, *C. cuprascens*, and *C. contigua* form a little group with the ♂ tibiæ dentate within. *C. texana* resembles these in sculpture, but has the ♂ tibiæ as in *C. dentipes*. *C. californica* only differs from *C. dentipes* by the larger size and hairy prosternum in the male; *C. vulcanica* resembles *C. trinervia* very closely, and may be only a large female of it. *C. debilis* and *disjuncta* do not appear to me separable. *C. deleta* has the eyes more widely separated on the vertex. *C. analis* I refer as a variety to *C. 6-signata*. *C. Harrisi* and *C. æneola* are distinct by the eyes much less approximate. *C. purpurata*, Bland, is a color variety of *C. æneola*.

Agrilus, Meg.

The somewhat numerous species of this genus are difficult to determine with accuracy; if, however, they were collected with care, and the sexes carefully determined, the labor would be much reduced. There are three or four species in collections which I have not described for want of sufficient material. The characters are not entirely similar to the European species, especially the sexual ones, which here consist of a hairy prosternum and front, and a more or less distinct channel on the first two segments of the abdomen. These segments are connate, but the suture is visible at the side in one or two species. The dorsal surface of the abdomen varies remarkably in the species, and might very possibly afford good characters; I have only used it for the keel on the last segment, which occasionally projects. The claws are bifid in some European species, but not in any American ones that I have seen; nevertheless they differ importantly, as pointed out by Leconte in his paper.

AGRILUS.

Aa. Claws with the appendices contiguous.
Ba. Scutellum not carinate.
Ca. Hind angles of the thorax not carinate. *fuscipennis.*
Cb. Hind angles carinate. *arcuatus.*
Bb. Scutellum carinate.
Ca. Pygidium with an elevated carina produced behind.
Da. ♂ abdomen impressed. *ruficollis.*
Db. ♂ abdomen simple, elytra bicostate. *difficilis.*
Cb. Pygidium not carinate.
Da. ♂ segments 1–2 impressed. L. .12–.18. *otiosus.*
Db. ♂ segments simple. L. .26–.32. *torquatus.* *fulgens.*
Ab. Claws with the appendices distant.
Ba. Scutellum carinate.
Ca. Thorax and head coarsely punctate, ♂ simple. *Walsinghami.*
Cb. Thorax and head rugulose.
Da. Pygidium with a projecting carina.
Ea. Sides of thorax pubescent.
Fa. Elytra with pubescent vittæ or spots. *bilineatus.* *granarius.* *subfasciatus.*
Fb. Elytra blue-green. *acutipennis.*
Fc. Elytra dull black. *vittatocollis.*
Eb. Thorax and elytra uniformly and very sparingly pubescent.
Fa. Green, finely granulate. *torpidus.* *anxius.*
Fb. Cupreous, coarsely granulate, thorax foveate. *macer.*
Db. Pygidium simple.
Ea. Elytra with patches of pubescence.
Fa. Hind angles of thorax carinate. *texana.* *fallax.* *interruptus.*
Fb. Hind angles not carinate. *subcinctus.*
Eb. Elytra uniform.
Fa. Head deeply sulcate, ♂ hardly impressed. *addendus.*
Fb. Head at most impressed.
Ga. ♂ segments impressed. *egenus.* *lacustris.* *imbellis.* *floridana.* *pubiventris.*
Gb. ♂ segments simple. *plumbeus.* *politus.*

Bb. Scutellum not carinate.
Ca. Elytra entire. ***muticus.***
Cb. Elytra serrate at apex.
Da. Elytra with pubescent spots. ***Cousii.***
Db. Head deeply sulcate. ***pulchellus.***
Dc. Head plane, elytra cupreous. ***obolinus.***

A. fuscipennis, Gory, Lec.

Elytra hardly denticulate at the apex, ♂ with the abdomen simple, prosternum very hairy, thorax with the hind angles not carinate, scutellum not carinate.

A. arcuatus (Say), Lec.

Prosternum sinuate in front, scutellum not carinate. I have not seen the male.

A. ruficollis (Fab.), Lec.

Very like the preceding, but distinct by the carinate thoracic angles, and the dorsal carina of the abdomen, which is acute and prominent; the male has a channel on the 2d segment; prosternum not hairy.

A. torquatus, Lec.

♂ abdomen not impressed, prosternum hairy.

A. fulgens, Lec.

♂ 1st segment slightly impressed at its apex, prosternum hairy.

A. obliquus, Lec.

This is founded on a single ♀, which I am disposed to refer to *A. fulgens.*

A. otiosus (Say), Lec.

♂ with segments 1–2 impressed, prosternum pilose, front opaque green, pilose. *A. geminatus*, Say, belongs here, from his description.

A. defectus, Lec.

This is founded on rather large females of *A. otiosus.*

A. pusillus, Lec.

Founded on one female specimen which I cannot separate from *A. otiosus.*

A. difficilis, Gory, Lec.

Elytra faintly bicostate; prosternum triangularly emarginate

in front, dorsal carina acute, projecting; ♂ with the abdomen simple, front and prosternum pubescent.

A. bilineatus (Weber), Lec.

Dorsal carina acute, projecting; ♂ prosternum not pilose; 2d segment channelled.

A. granulatus (Say), Lec.

Dorsal carina acute, projecting; ♂ front and prosternum pubescent.

A. biguttatus, Gory, Lec.

This is evidently identical with the preceding, as is also *A. zemes*, Gory.

A. subfasciatus, ‖ Lec.

♂ with a pubescent fovea on the 1st segment, dorsal carina projecting.

This name has been changed to *A. Lecontii*, by Saunders in his *Catalogus Buprestidarum*.

A. fallax (Say), Lec.

♂ front green, opaque, pubescent, prosternum pilose; 2d segment with a broad pubescent fovea.

A. interruptus, Lec.

Very like the preceding, but the prosternum is sinuate in front.

A. subcinctus, Gory, Lec.

♂ abdomen simple.

A. acutipennis, Mann. *latebrus*, Lap., Lec.

Dorsal carina projecting, 1st ventral suture visible at the sides, ♂ front pubescent, 2d segment deeply impressed.

A. torpidus, Lec.

Prosternum sinuate in front, dorsal carina projecting, ♂ 2d segment with a well-defined unpunctate channel.

A. anxius, Gory, Lec.

Very close to the preceding, but prosternum entire in front; ♂ similar.

A. pulchellus, Bland.

♀. Elongate, above with the head, thorax, scutellum, and suture of the elytra violet-blue, their margins brilliant coppery; antennæ short, stout, the third joint evidently triangular; head very deeply sulcate, rugose, pubescent; thorax rugose, sides and median line

pubescent; angles with a faint carina parallel to the sides; scutellum rugose, not carinate; elytra imbricate; body beneath bluish-black, densely clothed with yellowish pubescence. L. .37. Colorado (Leconte).

Claws separate, prosternum not sinuate in front; elytra rounded, slightly serrate, ventral segments with the suture almost apparent.

A. Couesii, Lec.

Elongate, golden-green, head deeply sulcate, but with two oblong tubercles between the eyes; thorax subtransverse, with very deep medial groove rugose at the bottom (the ridges smooth), front angles produced, sides thickly flavo-pubescent, carina strong, curved; scutellum smooth, with a deep punctate fovea occupying the middle; elytra rugose punctate, with a smooth violet dorsal carina, not quite reaching the apex; the sutural groove is pubescent, except two spots, one after the other, before the apex, the outer groove bare and more coarsely punctate, apex acutely serrate; sterna pubescent, abdomen shining, scarcely punctate in the middle, sides with densely pubescent spots. L. .42. Arizona (Coues).

Identified with *A. perlucidus*, Gory, by H. Deyrolle, but only the type could render such identification possible.

Prosternum flat, not depressed behind.

A. texanus, sp. n.

♀. Very closely allied to *A. Couesii*, but coppery above; head with the tubercles more developed, so as to leave a frontal pit; thorax uniformly rugose, carina much fainter, sides not pubescent, scutellum carinate; elytra more sparingly punctate, similarly pubescent. Sides of metasternum and a lateral spot on the third segment only pubescent. L. .38. Texas (Leconte).

A. floridanus, sp. n.

Allied to *A. interruptus*, Lec., but front narrow, deeply sulcate; thorax strongly rugose, carina well marked; elytra not sulcate, but with three pubescent spots, one basal, one before the middle, and at three-fourths near the suture; ventral segments punctulate, last three with lateral pubescence. L. .30. Florida (Horn).

♂. Prosternum hairy, first segment with an elongate pubescent fovea.

A. imbellis, sp. n.

Closely allied to *A. egenus*, but rather broader, entirely uni-

formly æneous; thorax strongly and regularly rugose, the carina evident, not widely divergent from the margin; elytra hardly grooved longitudinally. L. .21. Florida (Horn).

♂ First and second ventral segments with a pubescent impression, prosternum with long white hairs, front shining, strongly punctate as in the female; differs from *A. egenus* by its male characters.

A. pubiventris, sp. n.

Bright green, sometimes slightly æneous; head flat, thorax longer than broad, uniformly rugose, with a faint medial channel, carinæ not acute, nearly parallel to the sides; elytra uniform, closely imbricate, apex distinctly serrate, under surface shining, ventral segments sparingly rugosely punctulate. L. .24. Texas.

♀ First two segments with a rather deep pubescent channel metasternum and prosternum, also strongly pubescent; front opaque pubescent.

A. addendus, sp. n.

Elongate, subcupreous above, sparsely and shortly pubescent; head rather deeply sulcate, thorax longer than broad, medial impression obsolete, carina acute, long; elytra transversely rugulose, with a shallow sutural impression, pubescence showing a tendency to form a basal and subapical spot; prosternum entire in front. L. .24. Texas (Belfrage).

♀ First two segments with a faint impression, prosternum and front pubescent.

A. Walsinghami, sp. n.

Elongate, cylindrical, bluish-green or cupreous, spotted with white pubescence; front narrow, sulcate, coarsely punctate; thorax subtransverse, deeply channelled in the middle (the ridges nearly smooth) lateral impressions deep, carina obtuse, not defined, surface coarsely punctate, punctures confluent at the sides; scutellum carinate, elytra scabrous, each with two raised costæ, and four pubescent spots; one elongate at the base, two (one before the middle, one towards the apex) between the first two costæ, one a little behind the middle, outside the second costæ; top serrate; sides of pro- and meta-sternum thickly clothed with white pubescence, and a lateral white spot on the sides of segments 2–5. L. .50. Oregon (Walsingham), California (Horn).

♀ abdomen simple, not impressed.

The two connate segments are quite distinct at the sides in this species, which is easily known from all others by the punctate thorax.

A. vittato collis (Rand.), Bost. J.

Elongate, black, opaque, head deeply and broadly sulcate, bright cupreous, thickly clothed with orange pubescence; thorax subtransverse, rugulose, hind angles not carinate, bright cupreous, sides and deep medial channel clothed with orange pubescence; scutellum carinate; elytra closely granulate, opaque; beneath subcupreous, finely and closely punctulate, with very short pubescence; prosternum concave behind, the hind angles acutely elevated. L. .35. Massachusetts.

♂ 1st ventral segment faintly, 2d distinctly impressed; last segment truncate or faintly emarginate.

Dorsal carina strongly projecting.

A. putillus, Say, Tr. Phil. Soc., vi. 162.

Elongate, æneous, shining, head sulcate (but not deeply so); thorax broader than long, sides oblique, middle faintly channelled, angles not carinate; scutellum carinate, elytra broadly grooved along the suture; prosternum deeply sinuate in front, abdominal segments sparingly punctate, pygidium not carinate. L. .14. Canada (Horn).

This agrees very well with Say's description, as pointed out to me by Dr. Horn.

Taphrocerus agriloides, sp. n.

Subelongate, æneous, head very sparingly punctate, with an impressed line on the front; thorax alutaceous, transverse, sides straight, coarsely and sparsely punctate, base with a rounded median lobe; elytra deeply punctate striate, the punctures decreasing towards the apex. L. .14. Texas (Belfrage).

In appearance very like *Agrilus putillus*.

Brachys.

B. lugubris, Lec., is the true *B. tessellata*, Fab.; *B. lævicauda* is considered a variety of *B. ovata;* Melshemier's name *ærosa* must be restored to *B. terminans*, ‡ Lap. The Fabrician species being S. American.

FEBRUARY 4.

Mr. VAUX, Vice-President, in the chair.

Eighteen members present.

The following papers were presented for publication:—

"On the Lingual Dentition of Certain Terrestrial Pulmonata from the United States, with remarks on their systematic value." By THOS. BLAND and WM. G. BINNEY.

"Catalogue of the recent species of the Class Brachiopoda." By W. H. DALL, U. S. C. S.

"Descriptions of Mexican Ichneumonidæ." By E. T. CRESSON.

Notice of Remains of Fishes in the Bridger Tertiary Formation of Wyoming.—Prof. LEIDY remarked that among the multitude of fossils which had been collected from the tertiary clays and sandstones of the Bridger Group of Wyoming, there were comparatively few pertaining to fishes. Nevertheless the remains of these are not unfrequent, but they are not so complete as one might have expected from the nature of the beds containing them. They usually occur as isolated bones, scales and teeth, and mostly indicate fishes related with our living Gars (*Lepidosteus*), and Mud Fish (*Amia*).

Prof. Marsh has already noticed several species of these fishes in the Proceedings of this Academy, 1871, p. 105, from the Bridger beds. Two of the species belong "to the genus Amia, about the size of the modern *A. calva*," the others indicate two species of Lepidosteus, "both having smooth scales and about the same size as the modern gar-pike."

The specimens submitted to our examinations from time to time consist of isolated vertebral centra, ganoid scales, fragments of jaws with teeth, and portions of spines. Many of these appear to indicate the following extinct species previously undescribed:—

LEPIDOSTEUS ATROX. Founded on remains, obtained in Prof. Hayden's expedition of 1870, at the junction of the Big Sandy and Green Rivers. They indicate a fish larger than the Alligator Gar of the Mississippi. A vertebral centrum from near the middle of the dorsal series is 8½ lines long. It is flat beneath and ornate with longitudinal and somewhat reticulate wrinkles. The parapoplyses are proportionately narrower than in the Alligator Gar. The accompanying scales have their ganoid surface perfectly smooth, flat, and without markings, and they are thicker than in the Alligator Gar.

LEPIDOSTEUS. Another species, indicated by remains accompanying the preceding, was about the size of the Gar pike, *Lepidosteus osseus*, and is propably one of those named by Prof. Marsh. A posterior dorsal has the centrum about 5¾ lines in length, and an accompanying caudal centrum is 5 lines in length. This was likewise provided with smooth flat scales.

LEPIDOSTEUS SIMPLEX. A species approximating in size the Alligator Gar, is indicated by some remains collected by James Stevenson, of Prof. Hayden's party of 1870, near Washakie Station. The articular cup of the basi-occipital bone is five lines high and ten lines wide. The centrum of the atlas is four lines long and ten lines wide. The accompanying scales are flat and smooth.

LEPIDOSTEUS NOTABILIS. Founded on the centrum of an anterior dorsal imbedded in a block of sandstone with casts of fresh-water shells, from near Washakie. The size of the centrum is about equal to a corresponding one of the Alligator Gar, but the parapoplyses are proportionately short. The under surface of the centrum is broad, flat, and marked with longitudinal furcate ridges. The sides are perpendicular, and not slanting as in the Alligator Gar. The length of the centrum is 8 lines.

AMIA (PROTAMIA) UINTAENSIS. Indicated by vertebral centra, discovered by Dr. J. Van A. Carter, near Dry Creek Cañon. The fish was proportionately broader in relation with its length than in the living Mud-fish, and was very much larger. The centrum of an anterior dorsal is about double the length, and four times the breadth of the same bone in *Amia calva*. The two ridges at the bottom of the centrum in the latter are substituted by two oval fossæ. The length of the centrum is about 5½ lines, its height an inch and a quarter, and its breadth an inch and three-quarters.

An atlas, probably belonging to the same species, flat in front and cupped behind, has nearly the same size.

AMIA (PROTAMIA) MEDIA. Indicated by remains from the junction of the Sandy and Green Rivers, collected in Hayden's expedition of 1870. A vertebral centrum from near the forepart of the dorsal series, indicates a species about twice the size of *Amia calva*. A pair of fossæ at the bottom of the centrum substitute the two ridges in the latter. The length of the centrum is 5½ lines, its height 10 lines, and its breadth 13 lines.

AMIA (PROTAMIA) GRACILIS. A smaller species than *Amia calva*, indicated by a middle dorsal centrum. Its length is 1.18 lines, its height 3.4 lines, and its width 3.8 lines.

HYPAMIA ELEGANS. A related genus to Amia is indicated by a vertebral centrum, discovered by Dr. Carter on Dry Creek. The specimen from the middle of the dorsal series, has its sides convergent below in a median prominence excavated into a pair of oval fossæ. The species was rather larger than *A. calva*. The length of the centrum is 2.2 lines, its depth 6.5 lines, and its breadth 7.6 lines.

PIMELODUS ANTIQUUS. Indicated by many fragments of pectoral spines and fragments of jaws, found with remains of *Lepidosteus atrox*, etc., at the junction of the Big Sandy and Green Rivers. The size of the species was from a foot to eighteen inches.

PHAREODUS ACUTUS. Represented by a number of jaw fragments with teeth found in association with the remains above noticed, at the junction of the Big Sandy and Green Rivers. The dentary bone contains a single closely crowded row of long cylindro-conical teeth, without any small ones behind. The shaft of the teeth is straight and not curved as in Amia, but the short conical points are abruptly bent inwardly. The premaxillaries contain a similar row of teeth, but with the points scarcely bent. Nine teeth occupy a space of seven and a half lines in a fragment of a dentary bone, the longest tooth being 2½ lines. Seven teeth occupy a space of seven lines in a fragment of a premaxillary, the first of the series being 3 lines long.

FEBRUARY 11.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-two members present.

Mr. THOMAS MEEHAN presented an apple, which was borne by a tree at Kittaning, in Pennsylvania, and which tree never produced any flowers in the popular acceptation of the term; but always yielded an abundance of fruit. Mr. M. said there was no novelty in this circumstance, as similar cases had been placed on record; but the specimen furnished a practical illustration of some morphological truths which could not often be demonstrated in the way this afforded the opportunity of doing.

It was admitted that a fruit was a branch with its accessory leaves, transformed. The apple fruit was made up of a series of whorls of leaves comprising five each. Cutting an apple through we found a series of five formed the carpels containing the seeds. Several series of whorls, very much retarded in development, probably formed the stamens, but this could not be well seen in the apple fruit, as they seemed to be almost absorbed in the corolla series. This was the next in order that appeared in the divided apple—the green curved fibrous line which we find in all apples midway between the "core" and the "rind" is the dividing line between the series which forms the corolla, and the outer series which forms the calyx. In this tree there are no pistils, the series which usually goes to make up this part of the fruit structure being either very rudimentary or entirely wanting. Hence there was no "core" to the fruit. The result of this want of development was that the usual calyx basin of the apple was in

this case occupied by a cavity three-quarters of an inch across. There were no petals; but in place five gland or rather bud-scale-like processes, at regular distances, on the edge of the green fibrous outline before referred to. The outer whorl, which usually forms the calyx, was almost asepalous, as a mere scarious membrane marked the place where the calyx segments or sepals should have appeared. It was so easy in this specimen to trace the dividing line between the outer or calycine whorl and the inner or corolline whorl, which uniting and becoming succulent formed the popular apple fruit, that it was worthy of note in this connection.

But the most interesting feature in this specimen was what were probably, from their similarity in appearance, cork cells, formed abundantly on the outside of the apple. It would seem, that, with the lack of development in the inner series of whorls necessary to the perfect fruit, those which remained were liable to take on somewhat the character of bark structure.

Dr. LECONTE mentioned that he had published in the Proceedings for December, 1866, a paper entitled "List of Coleoptera collected near Fort Whipple, Arizona, by Dr. Elliott Coues, U. S. A., in 1864-65." He had recently received a letter from Dr. Edward Palmer, stating that the specimens had been collected mostly by the latter, and in accordance with the desire of Dr. P. the fact was now recorded.

FEBRUARY 18.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following paper was presented for publication:—

"Description of Mexican Ichneumonidæ, Part II." By E. T. Cresson.

Mr. THOMAS MEEHAN presented specimens of leaves of a Begonia on which minute folioles appeared as densely as hair all over the upper surface, while the leaf was on the growing plant. The little growths first appeared as succulent hairs, and these hair-like processes subsequently divided or produced the leafy blades from their apices.

Mr. M. remarked that hairs were at any rate structurally but graded thorns, of which bristles were an intermediate stage. Spines often bore leaves, but it was unusual for thorns to do so. It might not be that these leaf-bearing processes were really hairs though they had that appearance.

He further observed that last year he called the attention of the Academy to the fact that in some Scrophulariaceous plants,

such as *Torenia* and *Mimulus*, the bilobed flattened stigmas closed when touched, as did the leaf of *Dionæa muscipula*. He had recently noticed that the divided pistil of *Tecoma jasminoides* had the same power. When touched with its own pollen it closed at once, and remained closed; but if touched with any foreign substance it opened again after the lapse of a short time. The Bignoniaceæ were closely allied to Scrophulariaceæ at any rate, and the plants of each might be expected to possess this power.

He also said that, as was well known, the violet and the balsam (Impatiens) produced two distinct forms of flowers—one with a corolla and the other without—the former producing them underground. It was remarkable that these secretly produced (cleistogenous) flowers, in which there was no opportunity for anything but self-fertilization, should be more fertile than those which had the most abundant opportunities of aid from wind, insects, and other favoring influences. The Catalonian jasmine of our greenhouses was another illustration of this phenomenon. He had observed, and no doubt others had often done the same, for many years past, that there was a great tendency to a supposed abortion of the flowers in this plant. But this year he had some plants which failed to produce a single perfect flower. To his astonishment these plants were covered with developing seed-vessels, while in the plants producing perfect flowers there was no sign of any such tendency. On examining these imperfect flowers he found a miniature corolla was formed, but so closely twisted together that it could not open, and always remained inside the calyx-segments. The pistils in these flowers were differently formed from those in the perfect ones. The last have the two segments of the bilobed pistil coiled in a spiral manner; the former has no appearance of any division, but seem united into a small cone. In many cases the style was somewhat flattened, and there appeared to be a stigmatic surface along each edge. It appeared from his examination that there was very little pollen in the anthers of these flowers, and the apex of the pistil was pushed beyond them, and the idea occurred to him that possibly fertilization might occur by the way of the stigmatic edge before referred to.

Mr. Thomas G. Gentry called the attention of the Academy to what he considered to be an interesting case of a change of habits which had recently occurred in the life of an ordinary chickaree, the *Scinus hudsonius* of Pallas. During the early part of last autumn, his attention was called to the fact that the birds in a certain designated locality of Mount Airy, during the hours of the night, were undergoing a system of wholesale destruction, the work of small animals which were supposed to belong to some species of Carnivore. Laboring under this impression, and being desirous of securing a specimen or two, he started for the scene of slaughter, bent upon discovering the name and character

of the animal; when within a few rods of the place, the almost deafening noise that greeted his ears, from the tall trees, led him to suspect that all was not right. After reaching the spot, a few moments of anxious waiting sufficed to reveal to him the cause of the noise and the origin of the sacrifice above alluded to; for, sitting upon a twig just over his head, he observed a *chickaree*, holding in its paws a bird which it had captured, and from which it was very contentedly sucking the life current.

It is a well-established fact, he further remarked, as far as he had been able to verify it, that the numerous species of Rodents, with but two exceptions at the most, subsist principally or entirely upon vegetable matter, especially the hard parts of plants, such as nuts, bark, and roots.

This habit of imitating the propensities of the *Mustelidæ*, he thought might have arisen from the habit which some squirrels possess, possibly the one under consideration, of sucking the eggs of birds; the blood-sucking habit, he assumed to be an outgrowth from the other.

This adoption of another's mode of life by *S. hudsonius*, he thought a discovery of some note, as usurpation of habits, leading to functional and structural changes in an animal's economy, is accounted an element of no mean weight in the *development hypothesis*, according to the testimony of able writers upon Evolution.

Prof. COPE exhibited the cranium of the horned Proboscidian of Wyoming, *Loxolophodon cornutus*, and made some remarks on its affinities. The short-footed Ungulates or *Proboscidia*, are represented by two very different families in the Eocene formations of North America, the *Eobasiliidæ* and *Bathmodontidæ*. The first embraces four known genera, as follows:—

1. Nasal bones with flat horizontal horn-cores overhanging their apex.

Cervical vertebræ short; malar bone much reduced in front. *Loxolophodon.*

2. Nasal bones with small tuberosities.

Cervical vertebræ short. *Eobasileus.*

Cervical vertebræ longer; the malar bone reaching maxillary face. *Uintatherium.*

3. Nasal bones without the anterior horn-cores.

Cervicals? *Megaceratops.*

Of the above genera there are five well-determined species, viz.: *L. cornutus*, Cope; *E. pressicornis*, Cope; *U. robustum*, Leidy; *U. lacustre*, Marsh; and *M. coloradoensis*, Leidy. *E. furcatus*, Cope, and *U. mirabile*, Marsh, would, perhaps, have to be added.

There are two genera of *Bathmodontidæ*, as follows:—

One posterior molar with two transverse crests. *Bathmodon.*

Three posterior cross-crested molars. *Metalophodon.*

Of this family four species are known, viz.: *Bathmodon radians*, Cope; *B. semicinctus*, Cope; *B. brevipes*, Cope; *Metalophodon armatus*, Cope.

FEBRUARY 25.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

The death of Commodore John P. Gillis, U.S.N., was announced.

The following gentlemen were elected members:—
Harry F. Baxter, M.D., Alfred Moore, John M. Hartman.

On report of the committees, the following papers were ordered to be printed:—

DESCRIPTIONS OF MEXICAN ICHNEUMONIDÆ.

BY E. T. CRESSON.

Most of the species described and enumerated in this paper were collected by Prof. F. Sumichrast in the environs of Orizaba and Cordova, and by him presented to the American Entomological Society, in whose collection the types are to be found. To the late Dr. Charles Sartorius the Society is also indebted for many new and interesting species collected by him in the neighborhood of Mirador.

The collection is exceedingly rich in species, especially of the subfamilies Ichneumonides, Cryptides, Ophionides, and Pimplides; and those belonging to the genera *Ichneumon* and *Mesostenus* are very numerous and variable in form, structure, etc. Many of the species are handsome in ornamentation and brilliant in color.

Genus ICHNEUMON, Linn.

Subgenus Patroclus.

This subgenus is at once distinguished from that of *Ichneumon* by the ungues being pectinate. The form is rather slender; the head flat, triangular when viewed in front; the cheeks not at all prominent; the antennæ long and slender, and not involute in ♀, and the scutellum convex or subconvex; ovipositor scarcely or not at all exserted. Only three species are known to me, and may be separated as follows:—

Body entirely blue-black..... 1. **nigrocæruleus.**
Body yellow, much marked above with black..... 2. **lectus.**
Body honey-yellow, abdomen fasciate with black..... 3. **toltecus.**

1. **Patroclus nigrocæruleus**, n. sp.

♀.—Blue-black; thorax deep blue, abdomen tinged with greenish in certain lights; antennæ black, with a broad, yellowish-white annulus; wings violaceus-black; anterior tibiæ yellowish in front. Thorax densely and strongly punctured; metathorax densely rugulose, the elevated lines not well-defined; wings ample, areolet 5-angular; legs slender; abdomen elongate, convex, finely and closely punctured; first segment dilated at tip, which is finely

aciculate; basal fovæ (gastrocoeli) of second segment large, deep, and obliquely striated. Length 6 lines.

Orizaba. (Sumichrast, No. 121.)

2. **Patrocles lectus.**

Ichneumon lectus, Cress., Trans. Am. Ent. Soc., ii. p. 18, ♂ ♀.

Orizaba. (Sumichrast, No. 6.)

3. **Patrocles tolteeus.**

Ichneumon toltecus, Cress., Trans. Am. Ent. Soc., ii. p. 17, ♂ ♀.

Orizaba. (Sumichrast, No. 32 ♀, 136 ♂.) The antennæ of the ♂ are black, with the scape ferruginous.

Subgenus Ichneumon.

In this subgenus are included a large number of species varying greatly in form, but with such intermediation that no line to divide them even into subgenera can be drawn. The head in some species is large, broad, and buccate, but is gradually reduced to a small, flat, triangular form. The antennæ vary from robust, involute (♀), with very short, almost moniliform, joints, to a very slender form, not at all involute (♀), with elongate joints, and sometimes slightly dilated near the apex, as in *Joppa*. The scutellum varies from being perfectly flat, through convex, conical, to spinose, and even bispinose, with all intermediate grades. So also with the metathorax, which varies from being rounded, with no appearance of lateral protuberances, to truncate behind, with long and acute lateral spines. The species having the last character, together with a slender form, were formerly referred to *Hoplismenus;* but since the examination of so many intermediate forms, it is quite impossible to draw a dividing line between it and *Ichneumon;* therefore, no attempt is made here to divide the species into subgenera.

The following diagnostic table will assist in determining the species:—

Scutellum flat, subconvex, or convex:

Body entirely honey-yellow or ferruginous:

Large; scutellum flat above, lateral margin carinate, sides abrupt; metathorax without spines; antennæ black, with white annulus in ♀..... 8. **dilucidus.**

Medium; scutellum perfectly flat, sides not abrupt; metathorax with short acute spines; antennæ, ♀, tricolored, ferruginous, white and black..... 9. **ablutus.**

Small; scutellum convex, sides abrupt; metathorax without spines; antennæ ♂ black, with a white annulus ..... 11. **frivolus.**

Body honey-yellow or ferruginous, slightly marked with black:

Ferruginous; black band at base of third abdominal segment; antennæ ♀ black, with white annulus and red at base; wings yellow-hyaline; posterior legs ferruginous..... 10. **passivus.**

Ferruginous; black band at base of second and third abdominal segments; wings yellowish, banded with fuliginous; antennæ, ♂ ♀, tricolored..... 16. **cupidus.**

Ferruginous; black band at base of second and third abdominal segments; posterior legs mostly black; wings yellowish, of ♂ dusky at base and apex; antennæ, ♂ ♀, tricolored. 14. **isucarus.**

Ferruginous; abdominal segments constricted at base; wings blackish, with a broad submedian yellow band..... 15. **arrogans.**

Body yellow, abdomen entirely so:

Spots on vertex and occiput, a spot on anterior margin of mesothorax, a line on each side over tegulæ, and the antennæ, black. 18. **citrinus.**

Spot on vertex, mesothorax except four yellow stripes, and the antennæ, black; thorax yellow, legs and abdomen honey-yellow. 12. **additus.**

Body black; abdomen yellow, with black band on third and fourth segments; legs honey-yellow, apex of posterior femora black; antennæ tricolored; scutellum yellow..... 45. **placitus.**

Head and thorax black; abdomen ferruginous:

Head and thorax entirely black..... 2. **meridionalis.**

Head and thorax marked more or less with white:

Metathorax without spines:

Large; scutellum perfectly flat, margined with white; metathorax entirely black..... 3. **mexicanus.**

Small; scutellum flat above, with two white spots, sides abrupt; meso- and metathorax entirely black; abdomen short, ovate. 4. **totonacus.**

Metathorax with two spines:

Small; scutellum flat, with two white spots; mesothorax with two short white discal lines, and metathorax with two white apical spots; abdomen short, ovate, immaculate..... 5. **otomitus.**

Small; scutellum rather flat, white; mesothorax black; metathorax red; abdomen ♂ elongate, polished, more or less blackish on three basal segments above; of ♀ immaculate. 7. **curiatus.**

Medium; scutellum subconvex, sides abrupt, red at base, white at tip; metathorax entirely red; posterior tibiæ black, their tarsi white..... 6. **chiapus.**

Rather large, slender; scutellum rather flat, white, sides abrupt; mesothorax opaque, with white spot on each side over tegulæ; metathorax with long acute spines, and with a broad black T mark above ..... 65. **rixosus.**

Body metallic blue-green; legs ferruginous; antennæ black, with white annulus; scutellum flat above with white spot, carinate laterally, sides abrupt ..... 64. **virescens.**

Body black; apex of abdomen and legs, except apex of posterior femora and tibiæ, yellow; antennæ black with white annulus; scutellum flat in ♀, convex in ♂ ..... 1. **conicus.**

Body dull-black, opaque; orbits, scutellum, two stripes on metathorax, and narrow band on two or three basal segments of abdomen, white; costal margin of anterior wings fuscous. 17. **opaculus.**

Body deep black; abdomen long and subcylindrical; with apical margin of first and second segments white..... 18. **junceus.**

Body black, marked with white or yellowish; abdomen with white or yellow and black bands on all the segments:

Metathorax without prominent lateral tubercles:

Mesothorax with a white or yellow discal spot:

Line on posterior femora above and their tibiæ except tips, black, their tarsi yellow..... 37. **Cholula.**

Apex of posterior femora and tibiæ, and their tarsi black. 52. **amecus.**

Mesothorax with discal lines abbreviated:

Abdomen long, parallel, coarsely sculptured, gastrocoeli large and very deep..... 36. **prolixus.**

Abdomen shorter, finely and densely punctured, gastrocoeli small, deep; pleura yellow, with a longitudinal black stripe. 19. **zapotecus.**

Abdomen polished, with second segment finely and densely punctured; gastrocoeli small, punctiform; thorax with three large lateral white spots ..... 23. **tepanecus.**

Abdomen entirely polished, impunctured; gastrocoeli subobsolete; thorax with two large lateral white marks, the anterior one larger and oblique ..... 21. **zacatecus.**

Abdomen long, rather slender, granulated, gastrocoeli large, deep:

Posterior thighs black above and within ..... 40. **Toluca.**

Posterior thighs entirely honey-yellow ..... 41. **Chalco.**

Abdomen elongate, depressed; metathorax except basal suture or a basal median black spot, yellow..... 53. **parandus.**

Mesothorax with discal lines entire:

Metathorax with a central black stripe and slender lateral line. 59. **centrosus.**

Metathorax with a central black stripe and a lateral sub-basal black spot ..... 58. **decorosus.**

Metathorax with only a central black stripe:
Posterior femora entirely black ..... 54. **abaculus.**
Posterior femora black at tips and on upper edge.. 60. **jugiosus.**
Posterior femora entirely yellow ..... 55. **abitus.**
Metathorax yellow, with only a black dot on basal middle, most of abdomen yellow, with narrow black bands..... 56. **durus.**
Metathorax with arcuate blackish line at base, extending down on each side, and an elongate spot at apex..... 63. **monitus.**
Metathorax with two black basal spots:
Antennæ ♂ entirely black above ..... 50. **chichimecus.**
Antennæ ♂ with yellowish annulus..... 61. **limitaris.**
Metathorax with two oblique black lines, dilated above; antennæ short, very slender toward tips ..... 62. **tenuicornis.**
Metathorax with three large black spots above, posterior spot the larger; abdomen polished; posterior tibiæ black. 46. **epicus.**
Metathorax with three black spots above, the two basal ones largest; abdomen opaque ..... 39. **excuratus.**
Metathorax with a central, apical, and two confluent black spots; hind tibiæ with exterior edge black ..... 38. **saptlanus.**
Metathorax black above, divided by narrow yellow lines into several elongate spots; hind femora and tibiæ black at tips.
57. **Alvarado.**
Metathorax with two short lines at base; abdomen long, slender, cylindrical, posterior legs honey-yellow, tarsi yellow.
51. **teres.**
Mesothorax with a short white line on each side over the tegulæ:
Scutellum black, with lateral margin white ..... 20. **encaustus.**
Scutellum entirely white ..... 22. **Parredes.**
Mesothorax entirely black: metathorax black with a large yellow discal mark ..... 44. **ignarus.**
Metathorax with prominent lateral tubercles or spines:
Mesothorax with white discal spot ..... 68. **picturatus.**
Mesothorax with discal lines abbreviated:
Posterior tibiæ entirely black, their tarsi white, with most of basal joint black ..... 32. **Arista.**
Posterior tibiæ yellow, apex black, their tarsi yellow.
24. **subspinosus.**
Posterior tibiæ entirely fulvous:
Basal segment of abdomen with apex white; metathorax black at base and down middle to apex, three small white spots on basal margin ..... 25. **actuosus.**
Basal segment of abdomen with apex white; metathorax above with two longitudinal black lines from base to spines, and a central apical black line ..... 33. **maritus.**
Basal segment of abdomen with apex yellow, second segment with two oblique black stripes confluent at base; metathorax with two large black spots near base ..... 48. **abjectus**

Basal segment of abdomen with apex black; metathorax with two dilated longitudinal black lines above; head unusually large ..... 49. **cephalotes.**

Basal segment of abdomen with two apical yellow spots. 69. **dissonus.**

Mesothorax with discal lines entire:

Metathorax broadly black at base; posterior femora at tips and within, and apex of their tibiæ, black..... 42. **inoratus.**

Metathorax broadly black at base; posterior femora fulvous, apex slightly black, their tibiæ yellow, black at tips 43. **mendicus.**

Metathorax with four black dots on basal middle; posterior legs yellow, with femora black..... 47. **nigrofemoratus.**

Metathorax with three slender black stripes, connected above spines with a broad black band; posterior femora and tibiæ with black line above ..... 66. **munitus.**

Mesothorax with a curved line, dilated anteriorly, on each side over tegulæ..... 67. **propinquus.**

Mesothorax with a spot, or a straight line on each side over tegulæ:

Metathorax entirely black, mesothorax opaque..... 70. **minax.**

Metathorax black, with two small spots at base, two elongate ones beneath spines, and a large round one on flanks, all white; mesothorax polished ..... 26. **Nestor.**

Metathorax with a broad, cruciform black mark above, slightly interrupted below the transverse bar; mesothorax shining. 34. **Tuxtla.**

Metathorax with only two short longitudinal black lines, extending from base to spines; body shining, long, slender, subcylindrical ..... 30. **intentus.**

Metathorax with dusky, longitudinal, ill-defined marks above; scutellum black on middle; abdomen smooth, and highly polished ..... 71. **limatus.**

Mesothorax entirely black:

Posterior femora and tibiæ black at tips..... 27. **Toros.**

Posterior femora black above, their tibiæ entirely black; metathorax with three black stripes, connected above spines by a black band..... 35. **solitarius.**

Posterior femora black above, their tibiæ entirely black, metathorax black at base above, the sides, apex, and an elongate spot on basal middle, whitish ..... 28. **famelicus.**

Posterior femora above, and more or less of their tibiæ above, black; metathorax with two broad black lines extending from base to spines, and a narrow, central, black line at apex. 29. **tenebricus.**

Posterior femora and tibiæ fulvous, the former slightly dusky above; metathorax with two broad stripes from base to spines, and a bilobed mark at apex; abdomen short and polished. 31. **gracilentus.**

Scutellum conical, apex obtuse:

Yellow; vertex, occiput, three elongate marks on mesothorax, antennæ and posterior tibiæ and tarsi black..... 72. **Montezuma.**

Yellow; base of abdominal segments with a narrow black band; mesothorax with three longitudinal black lines; posterior tarsi black..... 73. **exquisitus.**

Entirely honey-yellow; antennæ black.....74. **abactus.**

Scutellum conical, apex acute:

Honey-yellow; head and antennæ black, marked with white. 75. **occiputalis.**

Black and yellow or white species:

Mesothorax black, with central yellow spot; metathorax with two central stripes..... 77. **scutellaris.**

Mesothorax entirely black; metathorax with two black spots at base above, sometimes connected; posterior legs honey-yellow. 76. **esurialis.**

Mesothorax entirely dull black, opaque; metathorax and posterior femora black ..... 78. **simulans.**

Mesothorax black, with three short whitish lines, the anterior one broad; metathorax blackish above; posterior femora yellow, their tibiæ and tarsi black..... 79. **accilvus.**

Scutellum much elevated, oblique, apex with transverse edge:

Metathorax with prominent spines:

Yellow; abdominal segments with very narrow black band at base; metathorax entirely yellow; antennæ and posterior tibiæ and tarsi black..... 80. **aztecus.**

Black above; abdomen with broad black bands; metathorax with two sub-basal black spots..... 82. **lenis.**

Metathorax rounded, without spines:

Metathorax with two sub-basal black spots, connected to base by slender line..... 81. **tragicus.**

Metathorax with arcuate black line above..... 83. **infulatus.**

Scutellum bispinose..... 84. **abnormis.**

1. **Ichneumon conicus.**

Joppa conica, Brullé, Hymén. iv. 286. (?) Cresson, Trans. Am. Ent. Soc., ii. 29.

? *Ichneumon breviventris*, Cresson, Proc. Ent. Soc. Phil., iv. 12.

♀.—Black, opaque; palpi pale; antennæ with white annulus; wings hyaline, nervures black; legs yellow, apex of intermediate femora above, and tips of their tarsi, fuscous; posterior coxæ, apical half of their femora and apex of their tibiæ, black; abdomen beyond third segment, and venter yellow. Robust, densely and coarsely punctured, subpubescent; head large, buccate; an-

tennæ involute, rather slender; scutellum flat, with elongate, sparse punctures, sides carinate; metathorax gradually sloping behind, the posterior middle excavate; areolet small, 5-angular; legs subrobust; abdomen short, ovate, second and third segments longitudinally aciculate and punctured, basal segment rugose, the basal incisures of second and third segments very deep; first segment broadly and suddenly dilated at apex; gastrocoeli large and deep; apical segments smooth and shining. Length 6–6½ lines.

♂.—Antennæ quite slender; scutellum convex; apical third of wings more or less tinged with fuscous; four anterior legs, except ungues, entirely bright yellow; base of fourth abdominal segment black. Length 6 lines.

Orizaba; Cordova. (Sumichrast, No. 4.) This seems to differ from the unique specimen of the Cuban *Ichneumon breviventris*, Cresson, only by the more dense punctation of the mesothorax, by the sparsely punctured scutellum, and by the first abdominal segment being rugose and not aciculate.

2. Ichneumon meridionalis.

Ichneumon meridionalis, Cresson, Proc. Ent. Soc. Phil., iv. 12.

♂ ♀.—Black; antennæ with a white annulus; wings fuscous or black, with a brassy gloss; legs blackish-piceous, the anterior tibiæ and tarsi yellowish in front; abdomen rufo-ferruginous, basal segment black. Form elongate, slender, densely punctured; antennæ involute in ♀; mesothorax granulated; scutellum slightly convex, rugose; metathorax rugose, shining, elevated lines subobsolete; areolet large, 5-angular or subquadrate, the lower apical side very short, the other sides subequal; abdomen elongate, subcylindrical, densely punctured; basal segment deeply punctured at tip. Length 5½ lines.

Orizaba; Mirador. (Sumichrast, No. 59.) This species occurs also in Cuba.

3. Ichneumon mexicanus.

Ichneumon mexicanus, Cress., Trans. Am. Ent. Soc., ii. p. 2, ♂ ♀.

Orizaba; Cordova; Mirador. (Sumichrast, No. 11.) Common.

4. Ichneumon totonacus.

Ichneumon totonacus, Cress., Trans. Am. Ent. Soc., ii. p. 10, ♂.

Orizaba.

5. **Ichneumon otomitus.**

Hoplismenus otomitus, Cress., Trans. Am. Ent. Soc., ii. p. 21, ♀.

Orizaba.

6. **Ichneumon chiapus, n. sp.**

♂.—Head, antennæ, upper part of prothorax, mesothorax, surroundings of scutellum and posterior tibiæ black; face, orbits interrupted behind summit of eyes, broad annulus on antennæ, anterior margin of prothorax, spot on tip of scutellum, and posterior tarsi except extreme base and ungues, white; remainder, including base of scutellum, fulvo-ferruginous; wings subhyaline. Form slender; antennæ longer than body, slender; head narrowed beneath, scutellum abrupt on sides and apex, lateral margin carinate; metathorax rugose, truncate behind, with two short, obtuse, lateral tubercles; legs long and slender; abdomen elongate, depressed; first segment rugose; gastrocoeli deep and rugose. Length 6 lines.

Cordova.

7. **Ichneumon curiatus, n. sp.**

♀.—Head black; face, mouth, cheeks, and orbits, white; antennæ black, with broad annulus, and scape beneath white; prothorax black, margined with white; mesothorax black, a reddish spot on anterior margin, and two white spots on posterior margin; scutellum pale lemon-yellow, the surrounding space black; pleura and metathorax, legs and abdomen fulvous or honey-yellow, the anterior coxæ pale; wings hyaline, iridescent. Small, shining; head sub-buccate, face short; antennæ slender, involute; upper margin of prothorax prominent; scutellum rather flat; metathorax truncate behind, with two short acute lateral tubercles; abdomen short, ovate, depressed, polished, apex slightly yellowish. Length 3 lines.

♂.—Resembles the ♀, but more slender; the pleura is yellow, with a double black mark beneath wings; the metathorax has two elongate fuscous stains; the first segment of abdomen has a black spot before apex and the second and third, except apical margin, and basal margin of fourth segment are black. Length 3½ lines.

Orizaba.

8. **Ichneumon dilucidus, n. sp.**

♂ ♀.—Ferruginous, opaque; face of ♂ yellowish; antennæ black, base ferruginous, middle of flagellum in ♀ with white an-

nulus; wings hyaline, stained with yellowish. Form robust; antennæ of ♀ robust, involute, of ♂ porrect; body densely punctured; scutellum prominent, flat above, with carinate sides; abdomen longitudinally aciculate above. Length 6½ lines.

Orizaba; Cordova. (Sumichrast, No. 120.)

9. Ichneumon ablutus, n. sp.

♀.—Dull honey-yellow; antennæ with broad yellow annulus, apex black, and base yellowish-brown; wings hyaline, nervures and stigma honey-yellow; head buccate; antennæ involute, joints short and robust; thorax depressed, shagreened; scutellum flat; metathorax with well-defined elevated lines, forming a quadrate central area, apex truncate and excavate, with short, prominent, subacute lateral tubercles; legs robust; abdomen oblong-ovate, basal segment gradually dilated to apex, with a long, rather slender petiole, the apex above faintly aciculate; remaining segments smooth, shining, and subpubescent, except base of second, which is faintly transversely aciculate; gastrocoeli obsolete. Length 4 lines.

Orizaba.

10. Ichneumon passivus, n. sp.

♀.—Dull honey-yellow, opaque; antennæ black, with a narrow yellowish annulus, base reddish; face yellow; wings yellowish-hyaline, a dark line along basal transverse nervure, and a dark spot covering areolet, the extreme apex faintly clouded; mesothorax and base of second abdominal segment tinged with reddish-brown; base of third segment with a black band. Head flat, not buccate, eyes large and prominent; antennæ slender, not involute, joints elongate; thorax shagreened; scutellum flat above, abrupt on sides, with carinate edge; metathorax gradually sloping behind, with prominent, subacute lateral tubercles, the elevated lines subobsolete; wings ample, areolet small, triangular; legs long and rather slender; abdomen elongate, minutely punctured, basal segment smooth and shining, with long slender petiole, rather suddenly dilated at apex; gastrocoeli large, deep, and transverse. Length 5½ lines.

Orizaba.

11. Ichneumon frivolus.

Ichneumon frivolus, Cress., Trans. Am. Ent. Soc., ii. p. 11, ♂.

Orizaba; Cordova.

12. **Ichneumon additus**, n. sp.

♂.—Lemon-yellow; broad stripe on vertex, covering ocelli and posterior margin of occiput, and the antennæ except scape (apical half wanting), black; mesothorax black, with two central yellow lines, confluent behind; lateral region of scutellum, spot beneath tegulæ, and extreme base of first abdominal segment, black; wings hyaline, iridescent; posterior legs pale fulvous, their tarsi blackish; abdomen pale fulvous, with incisures of segments pale. Small, head not buccate; scutellum flat; metathorax rugose, subtruncate behind, elevated lines well defined; abdomen elongate, convex, sides subparallel. Length 3½ lines.

Orizaba.

13. **Ichneumon citrinus**, n. sp.

♂.—Citron or lemon-yellow; spot inclosing ocelli, sometimes two spots on occiput, antennæ except scape, and three short, broad stripes on mesothorax, the middle one sometimes reduced to a spot in front, black; wings smoky-hyaline, nervures black. Head broad, buccate; scutellum rather flat; metathorax rugose, truncate behind, elevated lines tolerably well defined; legs robust; abdomen elongate, depressed; gastrocoeli punctiform, not deep. Length 6½ lines.

Orizaba. (Sumichrast, No. 140.)

14. **Ichneumon izucarus**, n. sp.

♀.—Brown-ferruginous; antennæ tricolored, ferruginous, yellow and black; wings yellowish-hyaline, nervures pale fulvous; posterior tibiæ and tarsi black; abdomen tinged with yellowish on apical half of three basal segments; second and third segments with a broad black band at base. Form robust; head buccate; antennæ short, robust, involute, joints short; scutellum subconvex; metathorax granulated, truncate, and excavate behind, elevated lines well-defined; abdomen oblong-ovate, densely granulated, gastrocoeli small. Length 5½ lines.

♂.—More slender; face yellow; antennæ bicolored—base yellow, apex black; thoracic sutures black; wings stained with fuliginous at base and apex; legs black, anterior pair, except coxæ, most of intermediate tibiæ, their tarsi and posterior tarsi except base, yellow; four basal segments of abdomen stained with lemon-yellow at tips, the fourth having the basal suture black; second and third segments as in female. Length 6 lines.

Orizaba; Cordova.

15. **Ichneumon arrogans**, n. sp.

♀.—Ferruginous, opaque; apex of mandibles black; antennæ tricolored—red, yellow, and black; thoracic sutures black; wings blackish, with a broad, median, yellow band, the stigma and nervures within the band yellow, the remainder black; legs black, anterior pair more or less ferruginous; base of first segment of abdomen, and basal sutures of second and third, black, venter yellow. Subrobust, densely punctured; head large, subquadrate, buccate; antennæ slender, involute, joints short and robust; scutellum flat above, sides abrupt; metathorax truncate behind, elevated lines well defined; abdomen elongate, slightly constricted at base, gastrocoeli rather small and deep; apex of first segment with rather large punctures. Length 5½–6 lines.

♂.—More slender; scutellum sometimes tinged with yellowish; legs ferruginous, varied with yellow, the posterior pair generally black, with apex of tarsi yellow. Length 6½ lines.

Orizaba; Cordova. (Sumichrast, No. 159.)

16. **Ichneumon cupidus**, n. sp.

♀.—Brown-ferruginous, opaque; antennæ brown-ferruginous at base, yellow in middle and black at tips; wings yellow-hyaline, anterior pair with two broad transverse blackish bands, and apex dusky; nervures, except where passing through the bands, yellowish; tips of posterior tibiæ blackish, their tarsi yellowish; base of third abdominal segment occupied by a rather broad black band, and sometimes a blackish stain at base of second segment. Head flat, not buccate; eyes large; antennæ long and slender, not involute, joints elongate; scutellum flat above, sides abrupt, with carinate edge; metathorax densely sculptured, with a silvery sericeous reflection in certain lights, gradually sloping to apex, with short, subacute, lateral tubercles, elevated lines obsolete; legs subrobust; abdomen minutely sculptured; gastrocoeli transverse, rather large and deep.

♂.—More slender in form, with the face and anterior legs tinged with yellowish. Length 4½ lines.

Orizaba. (Sumichrast, No. 110.) This closely resembles *Cryptus cestus*, Say, in size and ornamentation.

17. **Ichneumon opaculus**, n. sp.

♂ ♀.—Opaque black; orbits, interrupted above, two dots beneath antennæ, two more on upper margin of clypeus, upper mar-

gin of prothorax, line on tegulæ, another beneath tegulæ, another beneath hind wing, base of scutellum, a line on each side before, postscutellum, two stripes on metathorax—confluent at tip, one or more dots on each side of pleura, most of middle coxæ, stripe on posterior pair, stripe on all the femora and tibiæ, and narrow apical margin of first four segments of abdomen, sometimes only of first two, lemon-yellow; antennæ brown-black, fulvous beneath; wings subhyaline, costa brown. Antennæ long and slender in ♂, shorter and subrobust in ♀; scutellum subconvex; abdomen ovate, first segment slender, slightly enlarged at tip. Length 4½–5½ lines.

Orizaba; Cordova. (Sumichrast, No. 107.)

18. **Ichneumon junceus**, n. sp.

♂.—Black; sides of face, narrow orbits, scape within, spot on mandibles, palpi, upper margin of prothorax—interrupted in middle, tegulæ, short line beneath, scutellum, postscutellum, irregular W-shaped mark on apex of metathorax, tips of four anterior femora, their tibiæ and tarsi entirely, spot on posterior coxæ behind, their tibiæ except tips, and apex of first two abdominal segments, yellowish-white; wings subhyaline, dusky at tips; head, thorax, and legs pubescent. Abdomen long, narrow, cylindrical. Length 6½ lines.

Cordova.

19. **Ichneumon zapotecus.**

Ichneumon zapotecus, Cress., Trans. Am. Ent. Soc., ii. p. 8, ♀.

Cordova. (Sumichrast, Nos. 27 and 93.)

20. **Ichneumon encaustus.**

Ichneumon encaustus, Cress., Trans. Am. Ent. Soc., ii. p. 4, ♂ ♀.

Orizaba; Cordova. (Sumichrast, No. 8.) The ♂ differs from the ♀ only in being smaller and much more slender. Length 4½–5 lines.

21. **Ichneumon zacatecus**, n. sp.

♀.—Differs from *encaustus*, as follows: the mesothorax has two short yellowish discal lines, confluent behind, and there is no yellowish spot on each side of tegulæ; the apical half of scutellum is yellowish; all the femora are entirely black within; the base of second abdominal segment is entirely black; and the gastrocoeli shallow. Same size.

Orizaba.

22. **Ichneumon Parredes.**
Ichneumon Parredes, Cress., Trans. Am. Ent. Soc., ii. p. 4, ♀.
Orizaba.

23. **Ichneumon tepanecus.**
Ichneumon tepanecus, Cress., Trans. Am. Ent. Soc., ii. p. 5, ♀.
Orizaba; Cordova. (Sumichrast, No. 55.)

24. **Ichneumon subspinosus.**
Ichneumon subspinosus, Cress., Trans. Am. Ent. Soc., ii. p. 17.
Orizaba; Cordova. (Sumichrast, No. 90.) This may be the ♂ of *tepanecus*.

25. **Ichneumon actuosus**, n. sp.
♂.—Closely resembles *subspinosus*, but differs, as follows: While the scutellum and postscutellum proper are yellow, as usual, the lateral region is entirely black, and not margined posteriorly with yellow; the metathorax has no lateral black stripe —only a central one, the extreme lateral margin is broadly black, and the spines are much shorter; posterior femora and tibiæ dark fulvous, the former darker and fuscous above; their tibiæ yellow; apex of abdomen tinged with fulvous. Length 5 lines.
Orizaba. (Sumichrast, No. 89.)

26. **Ichneumon Nestor.**
Ichneumon Nestor, Cress., Trans. Am. Ent. Soc., ii. p. 13, ♀.
Cordova.

27. **Ichneumon Toros.**
Ichneumon Toros, Cress., Trans. Am. Ent. Soc., ii. p. 14, ♀.
Cordova. (Sumichrast, No. 26.)

28. **Ichneumon famelicus.**
Ichneumon famelicus, Cress., Trans. Am. Ent. Soc., ii. p. 14, ♂.
Cordova. (Sumichrast, No. 25.)

29. **Ichneumon tenebricus.**
Ichneumon tenebricus, Cress., Trans. Am. Ent. Soc., ii. p. 15, ♂ ♀.
Orizaba; Cordova; Mirador. (Sumichrast, Nos. 62, 91, 92.) Varies in length from 4½ to 7 lines. A common species.

30. **Ichneumon intentus.**
Ichneumon intentus, Cress., Trans. Am. Ent. Soc., ii. p. 15, ♂ ♀.
Orizaba; Cordova. (Sumichrast, No. 117.) Varies in length from 4½ to 7½ lines. Also common.

31. Ichneumon gracilentus.

Ichneumon gracilentus, Cress., Trans. Am. Ent. Soc., ii. p. 16, ♂ ♀.

Cordova. (Sumichrast, No. 125.)

32. Ichneumon Arista.

Ichneumon Arista, Cress., Trans. Am. Ent. Soc., ii. p. 16, ♂ ♀.

Orizaba; Cordova. (Sumichrast, No. 118.) Varies in length from 6 to 8 lines.

33. Ichneumon maritus.

Ichneumon maritus, Cress., Trans. Am. Ent. Soc., ii. p. 16, ♂ ♀.

Cordova. (Sumichrast, Nos. 9 and 60.)

34. Ichneumon Tuxtla.

Ichneumon Tuxtla, Cress., Trans. Am. Ent. Soc., ii. p. 17, ♀.

Cordova.

35. Ichneumon solitarius, n. sp.

♂.—Black; face, mouth, orbits—broad on cheeks, broad annulus on antennæ, collar, tegulæ, line beneath, scutellum, postscutellum, metathorax (except three black stripes, connected by a slender black cross-line above spines), sides of pleura and beneath, base of first abdominal segment, lateral and apical margins of remaining segments and base of second and third, clay-white; legs luteous; spot on four posterior coxæ, all the femora above, four anterior tibiæ exteriorly, posterior pair entirely and base of their tarsi, black; wings hyaline, nervures black. Head and thorax robust, the former broad and sub-buccate, eyes large and prominent; thorax gibbous; scutellum flat; metathoracic spines long and acute; legs slender; abdomen long, slender, flat, especially towards apex; gastrocoeli deep. Length 6 lines.

Orizaba.

36. Ichneumon prolixus, n. sp.

♂.—Head yellow; vertex, except orbits, occiput and antennæ, except narrow whitish annulus and scape beneath, black; thorax yellow; prothorax, except margins, mesothorax, except two short discal lines, apex of scutellum, and the surrounding space, double line beneath wings, and three connected spots on metathorax above, black; tegulæ yellow; wings dusky hyaline, nervures black; legs yellow; apical line on four anterior femora behind, and line on posterior femora above and beneath confluent at tip within, black; abdomen black above, yellow beneath; apex of all the

segments above broadly yellow, dilated laterally on second and following segments; gastrocoeli yellow. Form elongate; head and thorax robust; abdomen depressed; head buccate; scutellum flat; metathorax truncate behind, no lateral tubercles; abdomen densely and longitudinally sculptured; gastrocoeli deep and transverse. Length 8 lines.

Cordova.

37. Ichneumon Cholula.

Ichneumon Cholula, Cress., Trans. Am. Ent. Soc., ii. p. 5, ♀.

Cordova. (Sumichrast, No. 85.)

38. Ichneumon saptlanus, n. sp.

♀.—Head yellow, middle of vertex and occiput black; antennæ black, scape beneath and broad annulus on flagellum, yellowish-white; prothorax and mesothorax black, margins of former and two central longitudinal, entire lines on latter, tegulæ, spot on each side behind, apex of scutellum, and postscutellum, yellow; metathorax yellow, with a central sub-basal, an apical and two lateral confluent, black spots; pleura yellow, with small black spot beneath wings; wings fusco-hyaline, nervures black; legs yellow; large spot on posterior coxæ above, all the femora above and apex within, and line on all the tibiæ behind, black; abdomen yellow, with a large, transverse black mark on each dorsal segment, occupying nearly the whole surface. Form robust; head buccate; scutellum flat, apex abrupt; metathorax rugose, without tubercles or spines; abdomen depressed, surface densely rugose, the segments more or less deeply incised at base; gastrocoeli deep and transverse. Length 6½ lines.

Orizaba.

39. Ichnêumon excuratus, n. sp.

♂.—Yellow; vertex and occiput, except orbits, spot on each side of prothorax, mesothorax, except two entire central yellow lines and a short line over tegulæ, scutellar region, two basal and an apical spot on metathorax, sutures of pleura, spot on all the coxæ, a line on all the femora above or within, spot near apex of first abdominal segment and all the remaining segments except broad apical margins, black; antennæ black above, fuscous beneath, scape beneath and a narrow annulus on flagellum, yellow; wings yellow-hyaline, dusky at tips, stigma and nervures fulvous;

tarsi tinged with fuscous. Elongate; head buccate; antennæ subserrate; scutellum subconvex; metathorax rounded, without tubercles spines; abdomen subclavate, densely sculptured, gastrocoeli deep. Length 6½ lines.

Cordova. (Sumichrast, No. 147.)

40. **Ichneumon Toluca.**

Ichneumon Toluca, Cress., Trans. Am. Ent. Soc., ii. p. 6, ♂.

Cordova. (Sumichrast, No. 73.)

41. **Ichneumon Chalco.**

Ichneumon Chalco, Cress., Trans. Am. Ent. Soc., ii. p. 7. ♂.

Cordova. (Sumichrist, No. 96.) This may be a variety of *Toluca*.

42. **Ichneumon inoratus**, n. sp.

♂.—Yellow; middle of vertex and occiput, antennæ except scape beneath and annulus on flagellum above, two dots on middle of prothorax, mesothorax except two entire discal lines, and another on each side over tegulæ, apex of scutellum and lateral region, broad band on base of metathorax above, and a spot on apical middle, spot on pleura beneath wings, and a spot beneath behind each anterior coxa, and abdomen except narrow apical band on each segment, black; legs yellow, the femora, especially posterior pair, tinged with fulvous; spot on apex of posterior coxæ, a stripe on all the femora behind, apex of posterior pair and apex of their tibiæ, black; wings yellowish-hyaline, nervures brown, stigma honey-yellow. Head narrow, not buccate; antennæ long and slender; scutellum flat; metathorax truncate behind, with the lateral spines short and acute; first and second abdominal segments densely punctured and opaque, remainder smooth and shining; posterior femora robust. Length 6 lines.

Mirador.

43. **Ichneumon mendicus**, n. sp.

♀.—Yellow; stripe on vertex confluent with large spot on occiput, antennæ except scape beneath and broad annulus on flagellum, spot on middle of prothorax, mesothorax except four longitudinal stripes, lateral region of scutellum, broad band on base of metathorax and lateral and apical sutures, apex of posterior coxæ, and of their tibiæ and of all the tarsi, and the abdomen except broad apical margins of all the segments, black; wings

hyaline, iridescent; all the femora fulvo-ferruginous, with the apex of posterior pair sometimes black. Small, shaped and sculptured like *inorata*, except that the head is broader; legs robust. Length 4 lines.

Orizaba.

44. Ichneumon ignarus, n. sp.

♂.—Black, opaque; face below antennæ, scape beneath, broad annulus on flagellum above, tegulæ, dot before and line beneath, scutellums, large irregular mark on metathorax behind, four anterior legs, posterior trochanters, extreme base of their femora, their tibiæ except apex, their tarsi entirely, broad apical bands on four basal segments of abdomen, and narrow one on fifth segment, yellow; antennæ beneath and at base above, and four anterior femora behind, fulvous; wings yellowish-hyaline, dusky at tips, stigma fulvous. Small and rather slender, head not buccate, scutellum flat; metathorax without tubercles or spines; legs slender. Length 4½ lines.

Cordova. (Sumichrast, No. 108.)

45. Ichneumon placitus, n. sp.

♀.—Black, opaque; anterior orbits, dilated on face and extending beneath eyes, clypeus, base of mandibles, and basal half of antennæ, yellowish-ferruginous; palpi and middle of antennæ yellow; apical third of antennæ black; line on collar, scutellum, spot on postscutellum, and indistinct spot on each side of metathorax posteriorly, yellow; tegulæ pale ferruginous; wings yellowish-hyaline, nervures pale fulvous, stigma yellowish; legs yellowish-ferruginous, coxæ, base of trochanters and apical half of posterior femora black; abdomen yellowish-ferruginous, second segment paler; first segment, except apex, and broad band at base of third and fourth segments, black; a sub-basal dusky spot on each side of second segment. Small, robust; head not buccate; antennæ rather robust, involute, joints short; scutellum subconvex, shining, sparsely punctured; metathorax rugose, with tolerably well defined elevated lines, apex truncate, with lateral tubercles short and obtuse; legs robust; abdomen oblong-ovate, depressed, very minutely sculptured. Length 4 lines.

Mirador.

46. Ichneumon epicus, n. sp.

♂.—Black; face, mouth, orbits, cheeks, scape beneath, annulus

on flagellum, margins of prothorax, two entire stripes on mesothorax, a line on each side over tegulæ, spot on each side before scutellum, scutellums, pleura except angular mark beneath wings, and spot above each anterior coxa, yellow; metathorax yellow, with three large black spots above, the apical one largest, and a black stripe dilated above on lateral suture; tegulæ pale yellow, pupilled with fuscous; wings dusky hyaline; legs yellow, stripe on all the femora above, tips of all the tarsi, most of posterior coxæ above, and their tibiæ except extreme base and apex, black; abdomen black above; apex of all the segments with a yellow band, broad and regular on the first and second, and much narrowed, sometimes suddenly so, on remaining segments; venter yellow. Form slender, shining; head sub-buccate; antennæ long and slender; thorax closely punctured; scutellum flat; metathorax truncate behind, with prominent lateral tubercles; abdomen polished, gastrocoeli small, marked by a yellowish linear mark. Length 4½ lines.

Mirador.

47. **Ichneumon nigrofemoratus**, n. sp.

♂.—Yellowish-white; spot behind antennæ, another covering ocelli and connected with a large spot on occiput, antennæ except scape beneath and broad white annulus beyond middle of flagellum, large triangular mark on each side of prothorax, mesothorax except two longitudinal lines dilated on disk, lateral region of scutellums, four dots (arranged in a square) on base of metathorax, two or three dots beneath wings, posterior femora entirely, subapical spot on first abdominal segment, large subtriangular spot on second, and basal half of each remaining segment, black; wings yellowish-hyaline, stigma luteous; tips of posterior tibiæ faintly fulvous. Form slender; head sub-buccate; antennæ as long as body, slender; scutellum flat; metathorax truncate behind, with two short acute spines; legs slender; abdomen flattened. Length 4½ lines.

Orizaba.

48. **Ichneumon abjectus**, n. sp.

♂.—Head white, middle of vertex and occiput black; antennæ black, with a broad white annulus; thorax black, with collar, margins of prothorax, two short discal lines on mesothorax, two spots on posterior margin, tegulæ, scutellums, and most of pleura, white; metathorax, legs, and abdomen more or less tinged with

fulvous, the former with two large black spots above in front of spines; a dot near apex of first abdominal segment, an angular line on the second and basal margin of following segments, black; wings hyaline, iridescent. Small, slender; head broad, buccate; scutellum flattened; metathorax with the spines very short and acute; legs long and slender; abdomen smooth and polished. Length 3 lines.

Cordova. (Sumichrast, No. 132.)

49. Ichneumon cephalotes, n. sp.

♀.—Head white, vertex and occiput, except orbits, black; antennæ entirely black, except broad white annulus on middle of flagellum; thorax white; prothorax except margins, mesothorax except two central abbreviated lines, scutellar regions and two broad stripes on metathorax above, black; legs pale fulvous, coxæ white, base of posterior pair and extreme tips of tarsi black; abdomen black, with petiole and apex of all the segments white; wings hyaline, beautifully iridescent. Small, slender, smooth and polished; head very large, subglobose, buccate; eyes ovate, prominent; antennæ long and slender; scutellum subconvex; metathorax with lateral spines very minute; legs subrobust. Length 3 lines.

Mirador. Readily distinguished by the large subglobose head.

50. Ichneumon chichimecus.

Ichneumon chichimecus, Cress., Trans. Am. Ent. Soc., ii. p. 19, ♂.

Orizaba; Cordova. (Sumichrast, No. 113.) Common.

51. Ichneumon teres.

Ichneumon teres, Cress., Trans. Am. Ent. Soc., ii. p. 18, ♂.

Cordova. (Sumichrast, No. 28.)

52. Ichneumon amecus, n. sp.

♂.—Lemon-yellow, opaque; middle of vertex and occiput, antennæ except scape beneath, spot on each side of prothorax, mesothorax except a yellow discal spot and a short line over tegulæ, space around scutellum, basal suture of metathorax, two spots above connected at base, posterior coxæ within, their trochanters, apex of femora and tibiæ and their tarsi, black; wings hyaline, faintly yellowish; femora fulvous, posterior pair except apex, rufous; abdomen tinged with fulvous; base of all the segments, except second, irregularly black. Form elongate, rather slender;

head sub-buccate; antennæ long and slender; scutellum subconvex; metathorax truncate behind, lateral tubercles short, not prominent, elevated lines sharply defined; legs slender; abdomen narrow, subconvex; gastrocoeli elongate, shallow. Length 6 lines.

Mirador.

53. **Ichneumon parandus**, n. sp.

♂.—Head yellow, middle of vertex, and occiput, black; antennæ black, scape yellow beneath, and flagellum with a fulvous annulus about the middle; thorax yellow; middle of prothorax, mesothorax, except two discal lines, generally abbreviated and confluent behind; sutures of scutellum and of metathorax, sometimes a spot on basal middle, spot beneath posterior wings, and two large spots on pleura beneath, between four anterior coxæ, black; wings yellowish-hyaline, stigma fulvous; legs yellow, femora more or less fulvous, posterior coxæ beneath and within, their femora within and generally irregularly so without, and apical half of their tibiæ, black; abdomen black, with apex of each segment more or less broadly yellow; venter yellow, marked with black. Head sub-buccate; scutellum large and convex; metathorax truncate behind, without lateral tubercles; abdomen oblong-ovate, densely sculptured; gastrocoeli obsolete. Length 6½ lines.

Orizaba; Cordova; Mirador.

54. **Ichneumon abaculus**, n. sp.

♂.—Head and thorax yellow; middle of vertex, occiput, antennæ except scape beneath, mesothorax except two entire central lines and a spot on each side over tegulæ, lateral region of scutellum, basal and apical sutures of metathorax and a stripe down the middle, a stain beneath wings and the pleura beneath and between the four anterior coxæ, black; wings yellowish-hyaline, nervures and stigma honey-yellow; legs yellow, four anterior femora behind and posterior coxæ beneath, fuscous; posterior femora and apex of their tibiæ black; abdomen above black, with apex of all the segments yellow, the bands becoming gradually narrower towards apex of abdomen. Form elongate, subrobust; head sub-buccate; scutellum subconvex; metathorax rounded, with sharply defined elevated lines and no lateral tubercles or

spines; abdomen elongate, slender at base, gastrocoeli moderate, genital organs largely developed. Length 6½–7 lines.

Orizaba.

55. Ichneumon abitus, n. sp.

♂.—Yellow; a spot on vertex connected with a line extending from eye to eye, and also to posterior margin of occiput, antennæ except scape beneath, spot on middle of prothorax, three longitudinal lines on mesothorax, basal suture of metathorax, an interrupted line down the middle, tips of posterior tibiæ, their tarsi except base, spot on middle of first abdominal segment, basal half of the second, third, and fourth, and base of remaining segments narrowly, black; wings hyaline, tinged with yellowish, stigma pale honey-yellow; legs faintly tinged with fulvous. Form rather slender; head not buccate; scutellum subconvex; metathorax rounded, without lateral tubercles or spines. Length 5 lines.

Cordova. (Sumichrast, No. 106.)

56. Ichneumon durus, n. sp.

♂.—Yellow; spot on vertex, transverse line on occiput, antennæ except scape, three broad lines on mesothorax, basal suture of metathorax and spot on basal middle, spot beneath tegulæ, extreme tips of posterior tibiæ and sometimes of femora, their tarsi except base, a narrow irregular band on base of second abdominal segment, broader ones dilated on middle posteriorly on third and fourth segments, and narrow one on the fifth, all black; wings yellow-hyaline, nervures and stigma honey-yellow. Form rather slender; head not buccate; scutellum subconvex; metathorax rounded, without tubercles or spines. Length 6½ lines.

Cordova. (Sumichrast, No. 156.)

57. Ichneumon Alvarado.

Ichneumon Alvarado, Cress., Trans. Am. Ent. Soc., ii. p. 7, ♂.

Orizaba; Cordova. (Sumichrast, No. 112.) Common. The antennæ of ♀ are black above with a whitish annulus, fulvous beneath, with black tips, robust, and involute. This species varies in length from 6 to 7½ lines.

58. Ichneumon decorosus.

Ichneumon decorosus, Cress., Trans. Am. Ent. Soc., ii. p. 8, ♂.

Cordova.

59. **Ichneumon centrosus.**

Ichneumon centrosus, Cress., Trans. Am. Ent. Soc., ii. p. 8, ♂.

Cordova. (Sumichrast, No. 71.)

60. **Ichneumon jugiosus.**

Ichneumon jugiosus, Cress., Trans. Am. Ent. Soc., ii. p. 9, ♂ ♀.

Orizaba; Cordova. The antennæ of ♂ are entirely black, except the scape beneath which is yellow.

61. **Ichneumon limitaris.**

Ichneumon limitaris, Cress., Trans. Am. Ent. Soc., ii. p. 9, ♂.

Cordova.

62. **Ichneumon tenuicornis.**

Ichneumon tenuicornis, Cress., Trans. Am. Ent. Soc., ii. p. 9, ♂.

Cordova. (Sumichrast, Nos. 72 and 98.)

63 **Ichneumon monitus.**

Ichneumon monitus, Cress., Trans. Am. Ent. Soc., ii. p. 10, ♀.

Cordova.

64. **Ichneumon virescens**, n. sp.

♀.—Head and thorax dark metallic green; face, orbits, margins of prothorax, tegulæ, transverse line beneath, curved line behind anterior coxæ, and spot on apex of scutellum, luteous; antennæ black, with broad white annulus, scape luteous beneath; wings yellowish-hyaline, nervures brown; legs rufous, four anterior coxæ and trochanters beneath, luteous; posterior legs with a violet reflection, tips of their femora and tibiæ blue-black; abdomen steel-blue, changing to green in certain lights; basal segment green. Form elongate, slender; head flat, triangular, eyes prominent; antennæ as long as body, slender, not involute; thorax very densely and rather coarsely punctured; scutellum flat above, abrupt on sides and apex, lateral edge carinate; metathorax truncate and excavate behind, lateral tubercles short and obtuse; wings long, narrow, areolet triangular; legs slender; abdomen elongate, depressed, shining toward apex; first segment rugose and bicarinate, the second and third segments, except apical margins, densely sculptured; gastrocoeli large, deep, and oblique. Length 7 lines.

Mirador.

65. **Ichneumon rixosus.**

Hoplismenus rixosus, Cress., Trans. Am. Ent. Soc., ii. p. 20, ♀.

Cordova.

66. Ichneumon munitus.
Hoplismenus munitus, Cress., Trans. Am. Ent. Soc., ii. p. 21, ♂ ♀.
Orizaba; Cordova. (Sumichrast, No. 2.) Common.

67. Ichneumon propinquus.
Hoplismenus propinquus, Cress., Trans. Am. Ent. Soc., ii. p. 22, ♀.
Cordova.

68. Ichneumon picturatus.
Ichneumon picturatus, Cress., Trans. Am. Ent. Soc., ii. p. 22, ♀.
Cordova.

69. Ichneumon dissonus.
Hoplismenus dissonus, Cress., Trans. Am. Ent. Soc., ii. p. 23. ♀.
Cordova.

70. Ichneumon minax.
Hoplismenus minax, Cress., Trans. Am. Ent. Soc., ii. p. 23, ♂ ♀.
Orizaba; Cordova. (Sumichrast, Nos. 48 and 98.) Common.

71. Ichneumon limatus.
Hoplismenus limatus, Cress., Trans. Am. Ent. Soc., ii. p. 24, ♂ ♀.
Cordova.

72. Ichneumon Montezuma.
Ichneumon Montezuma, Cress., Trans. Am. Ent. Soc., ii. p. 13, ♂.
Cordova. (Sumichrast, No. 57.)

73. Ichneumon exquisitus.
Ichneumon exquisitus, Cress., Trans. Am. Ent. Soc., ii. p. 12, ♂ ♀.
Orizaba; Cordova. (Sumichrast, Nos. 36, 37, 56.) Common.

74. Ichneumon abactus, p. sp.

♂.—Fulvo-ferruginous, opaque; face yellow; antennæ, except scape which is reddish, black; wings yellowish-hyaline, with a brilliant golden gloss, nervures and stigma black. Form slender, especially of abdomen; head not buccate; scutellum obtusely conical; metathorax with sharply defined elevated lines and with the lateral spines acute and prominent; abdomen narrow, very slender at base. Length 4½ lines.
Mirador.

75. Ichneumon occiputalis.
Hoplismenus occiputalis, Cress., Trans. Am. Ent. Soc., ii. p. 24, ♂ ♀.
Orizaba; Cordova. (Sumichrast, No. 51.) A common species.

76. **Ichneumon esurialis.**
Hoplismenus esurialis, Cress., Trans. Am. Ent. Soc., ii. p. 25, ♂ ♀.
Orizaba; Cordova. (Sumichrast, No. 12.) Common.

77. **Ichneumon scutellaris.**
Hoplismenus scutellaris, Cress., Trans. Am. Ent. Soc., ii. p. 26, ♂ ♀.
Orizaba; Cordova; Mirador. (Sumichrast, Nos. 99, 122, 131.) Common. Varies in length from 4 to 5½ lines.

78. **Ichneumon similans**, n. sp.
♂.—Black, opaque; face, orbits, cheeks, scape beneath, narrow annulus beyond middle of flagellum, collar, upper and lower margins of prothorax, tegulæ, line beneath, most of scutellums, apex of metathoracic spines, pleura beneath, and narrow posterior margin beneath posterior wings, and first abdominal segment except subapical black spot, pale luteous; wings subhyaline, nervures and stigma black; legs luteous, posterior coxæ above, their femora entirely, apex of their tibiæ and basal joint of their tarsi, black; four anterior femora and tibiæ somewhat fulvous behind. Form same as that of *acclivus*, with the scutellum less acute. Length 7½ lines.
Mirador.

79. **Ichneumon acclivus.**
Hoplismenus acclivus, Cress., Trans. Am. Ent. Soc., ii. p. 25, ♂.
Cordova. (Sumichrast, No. 95.)

80. **Ichneumon aztecus.**
Ichneumon aztecus, Cress., Trans. Am. Ent. Soc., ii. p. 20, ♂
Orizaba; Isthmus of Tehauntepec. (Sumichrast, No. 60.)

81. **Ichneumon tragicus.**
Ichneumon tragicus, Cress., Trans. Am. Ent. Soc., ii. p. 11, ♂.
Cordova. (Sumichrast, No. 30.)

82. **Ichneumon lenis.**
Ichneumon lenis, Cress., Trans. Am. Ent. Soc., ii. p. 19, ♀.
Orizaba; Cordova. (Sumichrast, No. 21.)

83. **Ichneumon infulatus.**
Ichneumon infulatus, Cress., Trans. Am. Ent. Soc., ii. p. 12, ♀.
Cordova.

84. **Ichneumon abnormis.**
Hoplismenus abnormis, Cress., Trans. Am. Ent. Soc., ii. p. 26, ♀.
Cordova. (Sumichrast, No. 23.)

Subgenus ŒDICEPHALUS.

In this subgenus the head is unusually large and swollen, very broad behind the eyes, the occiput deeply emarginate, the mandibles very broad; antennæ generally longer than the body; thorax robust; scutellum very broad, subquadrate, unituberculate, more or less prominent; metathorax short and broad, rather suddenly truncated behind, lateral tubercles very small or altogether wanting; wings long, areolet 5-angular; legs long, more robust than usual, posterior tibiæ incrassate toward the tips, the inner spur longer than usual; abdomen short, ovate in ♀, subdepressed, petiole slender, apex of first segment very broadly dilated, gastrocoeli broad, transverse and very deep, the second segment generally longitudinally aciculated.

1. **Œdicephalus longicornis.**
Œdicephalus longicornis, Cress., Trans. Am. Ent. Soc., ii. p. 27, ♀.
Cordova.

2. **Œdicephalus sororius.**
Œdicephalus sororius, Cress., Trans. Am. Ent. Soc., ii. p. 28.

♀.—Black, face, orbits interrupted a little below summit of eyes; cheeks, clypeus, mandibles except tips, palpi, annulus on antennæ, collar, tegulæ, a line before wings, two abbreviated lines on disk of mesothorax, two spots behind on each side of base of scutellum, whole of pectus, scutellum except a central black line, and a transverse line on postscutellum, white; metathorax white, with a black band near base, from which proceeds on each side a longitudinal black stripe; wings hyaline, nervures and stigma black; legs pale lemon-yellow, tips of posterior tarsi white, spot at tips of posterior coxæ, line on all the femora above, line on the four anterior tibiæ, most of their tarsi and bases of posterior tibiæ, black; first abdominal segment white, with a broad black band near the tip; second segment black, with a broad white apical margin and a white line on each side in front of gastrocoeli; remaining segments white, more or less black at the base. Polished; scutellum elevated into an obtuse tubercle; abdomen as in *longicornis*. Length 4½ lines.

Cordova. (Sumichrast, No. 84.) This may prove to be a variety of *longicornis*, although the antennæ are shorter and more robust. It is closely allied to *Œ. albovarius*, from Cuba.

3. **Œdicephalus gracilicornis.**

Œdicephalus gracilicornis, Cress., Trans. Am. Ent. Soc., ii. p. 28, ♂ ♀.

Cordova.

4. **Œdicephalus vicinus, n. sp.**

♀.—Size and shape of *gracilicornis*, with similar black markings, the pale color being lemon-yellow instead of white; the vertex and occiput, except orbits, which are not interrupted as in *gracilicornis*, are black; the discal lines of mesothorax are broader and abbreviated; the scutellum more acute; the metathorax has an irregular transverse black band before the truncation, which is continued posteriorly on each side in a narrow line, middle of truncation with a short black stripe; all the femora have a black stripe above, that on the posterior pair dilated within near apex; posterior coxæ black at base, with a subapical black spot, extreme base of their tibiæ black; second segment of abdomen strongly longitudinally aciculate and transversely sulcate; antennæ more robust; otherwise as in *gracilicornis*. Length 3½ lines.

Orizaba.

Subgenus ORTEZIA.

In this subgenus the form is broad, depressed and robust; the head small, narrowed beneath; scutellum broadly quadrate, shield-line, perfectly flat; metathorax broad and declivous, without tubercles or spines; legs short and robust; abdomen short, broad, ovate, depressed, *longitudinally rugose or aciculated, with the segments more or less constricted at base.*

1. **Ortezia egregia.**

Joppa? egregia, Cress., Trans. Am. Ent. Soc., ii. p. 30, ♀.

Orizaba. The abdomen is longitudinally rugose.

2. **Ortezia aciculata.**

Joppa? aciculata, Cress., Trans. Am. Ent. Soc., ii. p. 30, ♂ ♀.

Cordova. (Sumichrast, No. 83.) The abdomen is longitudinally aciculated.

Genus JOPPA, Fabr.

The species of this genus, so far as known from Mexico, are remarkably similar in style of color and ornamentation, all being bright lemon-yellow varied with black, having the wings yellow

banded with black, and in one specimen entirely fuliginous. All have the head broad, with swollen cheeks; the antennæ rather short, slender, that of the male more or less dilated near apex.

The following table will aid in distinguishing the species:—

Mesothorax vittate with black; wings with apex and submedian spot black. 1. **Sumichrastii.**

Mesothorax, scutellum, base of metathorax above and tip of abdomen, black; base and apex of wings black ..... 2. **decorata.**

Mesothorax above, and tip of abdomen black; base and apex of wings black. 3. **incerta.**

Mesothorax fulvous; tip of abdomen and apex of wings black. 4. **elegantula.**

Mesothorax fulvous; head and tip of abdomen black; wings fuliginous. 5. **fumipennis.**

1. **Joppa Sumichrastii.**

Joppa Sumichrastii, Cress., Trans. Am. Ent. Soc., ii. p. 31, ♂ ♀.

Orizaba; Cordova. (Sumichrast, Nos. 14 and 20.) Common.

2. **Joppa decorata.**

Joppa decorata, Cress., Trans. Am. Ent. Soc., ii. p. 32, ♂.

Orizaba.

3. **Joppa incerta**, n. sp.

♀.—Differs from *decorata* ♂ by the scutellum and metathorax being entirely yellow; the posterior tibiæ are broadly black at apex, and most of the basal joint of their tarsi yellow. Length 5 lines.

Orizaba. This may be the ♀ of *decorata*.

4. **Joppa elegantula.**

Joppa elegantula, Cress., Trans. Am. Ent. Soc., ii. p. 32, ♂ ♀.

Orizaba; Cordova. (Sumichrast, Nos. 15.) In color and markings the ♀ resembles the ♂.

5. **Joppa fumipennis.**

Joppa fumipennis, Cress., Trans. Am. Ent. Soc., ii. p. 32, ♂ ♀.

Orizaba; Cordova. (Sumichrast, No. 13.)

Genus TROGUS, Grav.

Wings violaceous-black, very broad; body steel blue; head, anterior half of thorax, and anterior legs, yellowish-red ..... 1. **latipennis.**

Wings hyaline, with two violaceous-black bands; body and legs black; posterior tarsi white ..... 2. **blandita.**

Wings hyaline, apex only violaceous-black; body black, marked with yellowish-white..... 3. **inolyta.**

1. **Trogus latipennis**, n. sp.

♀.—Blue-black, with a steel-blue reflection; head, pro- and mesothorax, pleura, and anterior legs, yellowish-red; vertex, antennæ and broad stripe over tegulæ, black; wings violaceous-black. Densely punctured, subpubescent; antennæ rather short, slender; scutellum convex; wings very broad, ample, areolet large, triangular; abdomen long, segments constricted at base, with a short basal longitudinal impressed line on each side, and an obtuse longitudinal ridge on disk of second and following segments. Length 9½ lines.

Orizaba. (Sumichrast, No. 62.) A beautiful species.

2. **Trogus blandita**, n. sp.

♂.—Deep black, opaque, sides of thorax, scutellum, legs, and basal and apical segments of abdomen polished; anterior orbits, slightly dilated on the face and interrupted opposite insertion of antennæ, a narrow line on posterior orbits, a spot on middle of face indented above, transverse line on clypeus and spot on mandibles, yellowish-white; antennæ long, slender, serrate, gradually attenuated to apex which is very slender, brown-black, scape polished, black; thorax immaculate, closely punctured, scutellum obtusely conical, with scattered punctures; metathorax shaped much as in *inclyta*, with the elevated lines more sharply defined, and the surface more deeply punctured, the pleura has a slight opaline reflection; wings dusky hyaline, the anterior pair with two fuliginous, brilliant violet bands, one occupying the entire apical third and the other about half the breadth of the first, placed across the middle, apical margin brassy, middle of stigma sub-hyaline, areolet small, sub-triangular, petiolated, posterior wings dusky at apex; legs shining black, anterior coxæ in front, their femora and tibiæ in front, and the intermediate tibiæ before, soiled white; posterior tarsi longer than tibiæ, white; apical joint and claws black; posterior coxæ dilated above into an obtuse tubercle, their basal trochanters flat and dilated, as in *inclyta*; abdomen flattened, first segment shining, grooved medially, and with large scattered punctures, the four following segments opaque, longitudinally aciculated dorsally, densely and deeply punctured laterally, the incisures deep, the second segment above with a small lateral sub-apical lunate white mark; two apical segments smooth and shining, with a faint opaline iridescence. Length 7 lines.

♀.—Larger and more robust; antennæ not serrate, slightly thickened toward apex; face black, with a short white line on each side; otherwise like the ♂.

Orizaba. Resembles *inclyta* in form and sculpture, but very different in ornamentation. The anterior wings have a broad blackish medial band, and the apex is broadly blackish, while *inclyta* has only the apex blackish.

3. **Trogus inclyta.**

Joppa inclyta, Cress., Trans. Am. Ent. Soc., ii. p. 29, ♀.

Cordova.

Genus CRYPTUS, Fabr.

Wings hyaline.
  Body black and white.
    Mesothorax with two short white discal lines.
      Large, robust; length 7 lines, ♀ ..... 1. **aztecus.**
      Small, slender; length 3 lines, ♂ ..... 2. **tantillus.**
    Mesothorax with central white spot.
      Metathorax black above, inclosing four white spots; base of second abdominal segment black..... 3. **tenuiventris.**
      Metathorax black at base, with a central black stripe; base of second abdominal segment white..... 4. **Celaya.**
      Metathorax with an arcuate black band and a black spot at tip. 5. **arcuatus.**
      Metathorax with only a narrow, median, black band. 6. **transversus.**
    Mesothorax with a central white stripe; metathorax with a transverse angular black mark near base..... 7. **angulatus.**
  Body pale ferruginous; head, antennæ, and mesothorax black and white; mesothorax with a central white dot..... 8. **citus.**
Wings fasciate with dusky; body pale honey-yellow... 9. **pulchripennis.**
Wings fuscous, subfasciate with yellowish; body ferruginous. 10. **xanthostigma.**

1. **Cryptus aztecus**, n. sp.

♀.—Black; face, orbits broad on the cheeks, palpi, broad complete annulus on antennæ above middle, anterior margin of prothorax, a triangular spot on each side posteriorly before the tegulæ, two abbreviated lines on disk of mesothorax, tegulæ, a short line beneath, a large elongate oblique mark on each side of pleura, with a small spot above it and with its lower posterior end indented with black, the scutellum and post-scutellum, a transverse spot behind posterior wing, four large spots on meta-

thorax posteriorly, four anterior coxæ and trochanters, posterior coxæ above and beneath, apical margins of all the abdominal segments, a band on first segment near base above, also its sides, and most of venter, all white; apical half of posterior trochanters, base of their tibiæ and tips of all the tarsi, dusky, posterior tarsi pale yellow, sides and extreme tips of posterior coxæ black; remainder of legs luteous; wings hyaline, slightly dusky at extreme tips, stigma with a pale spot at base. Antennæ more than half the length of body, third, fourth, and fifth joints long and subequal, the joints beyond the annulus slightly thickened; mesothorax without distinct dorsal impressed lines, very finely and closely punctured and interspersed with large scattering punctures; scutellum subconvex, the lateral regions crenulated; metathorax thinly clothed with white pubescence, obliquely truncate behind, rugose, the basal third smoother, bounded behind by a sharp transverse carina bent inwardly on the disk, also an oblique sharply defined carina on each side on the verge of the truncation, stigmata large, linear; areolet of anterior wing quadrate, smaller than usual; abdomen shining, fusiform, broad and robust beyond first segment, which is but slightly dilated at tip, with a longitudinal medial groove above and a depression on each side; ovipositor more than half the length of the body, black. Length 6–7¼ lines.

Orizaba; Cordova. (Sumichrast, No. 29.)

2. **Cryptus tantillus**, n. sp.

♂.—Black; face, mouth, orbits, cheeks, scape beneath, collar, tegulæ, line before, spot beneath, two discal spots on mesothorax, scutellums, space behind base of wings, pleura beneath and laterally except anterior and posterior margins, flanks of metathorax, two elongate marks on posterior face, four anterior coxæ and trochanters, posterior coxæ except black line above, most of posterior tarsi, and rather broad apical margins of abdominal segments, white; wings hyaline, beautifully iridescent; posterior trochanters above, apex of their tibiæ and base and apex of their tarsi, black. Form similar to that of *tenuiventris*. Length 3 lines.

Cordova. A small, very slender species.

3. **Cryptus tenuiventris**, n. sp.

♂.—Black; face, mouth, orbits, cheeks, scape beneath, broad

annulus on flagellum, collar, tegulæ, line before, dot beneath, elongate spot on disk of mesothorax, scutellum, space behind base of wings, flanks of metathorax, two spots at base and two at apex, pleura, base of four anterior legs, base of first abdominal segment, and broad apical margins of all the segments, white; wings hyaline, iridescent; legs, especially posterior pair, more or less yellow, posterior tarsi whitish, two stripes on posterior coxæ and all the femora above fuscous. Very slender, head broader than usual; metathorax rounded, with two transverse subarcuate carinæ and no tubercles or spines; areolet 5-angular; abdomen slender, gradually dilated at apex. Length 4¼ lines.

Orizaba. Also a very slender species.

4. **Cryptus Celaya**, n. sp.

♀.—Head black; face, mouth, cheeks and orbits white; antennæ black, with scape beneath and broad annulus on flagellum white; thorax white, tinged with yellowish; band on prothorax, mesothorax except central elongate spot, space around scutellums, base of metathorax, a broad central stripe and a slender one down each side, black; wings hyaline, nervures pale; legs dull luteous, pale at base, dot on intermediate coxæ and stripe on posterior pair black, four anterior tarsi dusky, posterior pair white, black at extreme tips; abdomen black with a broad white band on second and following segments above, base of second segment white, first segment white with a black spot before apex. Form rather small, slender; head not buccate, eyes large and prominent; antennæ long, slender, porrect; scutellum subconvex, metathorax sloping behind, the lateral tubercles small and obtuse; areolet subtriangular, small; legs slender; abdomen shining, first segment polished, apex subquadrate, slightly dilated; ovipositor half the length of abdomen. Length 4¼ lines.

Mirador. The metathorax has a broad black band at base, another down the middle and a slender one on each side.

5. **Cryptus arcuatus**, n. sp.

♀.—White; space beneath eyes, base and tips of mandibles, middle of vertex covering ocelli and extending to occiput, disk and lateral margins of prothorax, mesothorax except round discal spot, scutellar region, arcuate band on metathorax broad on disk, spot at apex, a slender oblique line beneath posterior wing, and a spot on outside of all the coxæ, larger and cuneiform on posterior

pair, beneath which at base are two elongate spots, black; antennæ long, slender, black, with a broad white annulus near apex, scape white beneath; wings hyaline, iridescent, nervures black; areolet rather small, 5-angular; legs honey-yellow, coxæ white, tips of four anterior tarsi blackish, posterior pair white, honey-yellow at extreme base and black at apex; abdomen black shining, base rather strongly arcuate, first segment white with a broad median black band, apical margins of remaining segments rather broadly white. Length 4½ lines.

Orizaba. Easily recognized by the conspicuous strongly arcuated black band on metathorax.

6. **Cryptus transversus**, n. sp.

♀.—White; spot on vertex covering ocelli, most of occiput, apex of mandibles, antennæ except scape beneath and broad annulus on flagellum, posterior margin of prothorax, central spot above, mesothorax except central spot, lateral region of scutellum, narrow transverse band on middle of metathorax directed obliquely backward on the flanks, slender line on posterior coxæ furcate at tip, apex of tarsi, spot on middle of first abdominal segment, remaining segments except broad apical margins, and dot on each basal corner of second segment, black; wings hyaline, extreme apical margin dusky; legs except coxæ bright yellow, posterior tarsi except tips white. Robust, opaque; metathorax smooth, rounded, with a single transverse carina bordering the posterior black band; areolet small, 5-angular; abdomen broad, depressed; legs subrobust. Length 5 lines.

Mirador. This is closely allied to *arcuatus*, but distinguished at once by the band on metathorax being transverse.

7. **Cryptus angulatus**, n. sp.

♀.—Yellowish-white; tips of mandibles, spot on middle of vertex covering ocelli and connected with two oblique lines on occiput, disk of prothorax, sutures of mesothorax, scutellar region, transverse sutural line immediately beneath wings, sutural line at base of metathorax, a slender oblique one on each side near tubercles, and a short angular mark on disk connected medially with base, black; antennæ black, with a rather broad white annulus beyond middle, scape white beneath; mesothorax ferruginous or brown, with a stripe on middle division and line over tegulæ, yellowish; metathorax with a short transverse cariniform tubercle on each side

above; wings hyaline, iridescent, nervures brown, areolet 5-angular, rather small; legs honey-yellow, coxæ yellowish-white more or less tinged with honey-yellow, posterior pair with dusky spot on outer side, tips of posterior tibiæ and of all the tarsi black, posterior tarsi white, base and apex black; abdomen slender at base, shining black, apical margins of all the segments broadly white, lateral margins narrowly so, basal half of first segment honey-yellow. Length 4½ lines.

Cordova. This pretty species is easily recognized by the angular black mark on disk of metathorax.

8. **Cryptus citus**, n. sp.

♀.—Head white, vertex and occiput except orbits, black; antennæ black, scape beneath and broad annulus on flagellum, white; collar and prothorax white, the latter with a central black stripe; mesothorax black, with a central white spot; scutellum white, the lateral region black; tegulæ and short line beneath white; metathorax honey-yellow, basal suture and median triangular stain, black; flanks of metathorax, and pleura whitish; wings hyaline, nervures and stigma blackish; legs honey-yellow, tips of all the tarsi, tips of posterior tibiæ and extreme base of their tarsi, blackish; remainder of posterior tarsi white; abdomen entirely honey-yellow; ovipositor black. Form slender; antennæ rather longer than body, filiform; metathorax rugulose, obliquely truncate behind, with a short, transverse, sharply defined carina on each side and a subarcuate indistinct carina between middle and base; areolet 5-angular, not large; legs slender; abdomen slender, smooth, somewhat shining; ovipositor longer than first abdominal segment. Length 4¼ lines.

Orizaba. Allied to *atricollaris*, Walsh.

9. **Cryptus pulchripennis**, n. sp.

♀.—Uniformly ferruginous, slender; narrow anterior and posterior orbits yellowish-white; antennæ long, slender, black, with a broad pale yellowish annulus about the middle, base ferruginous; disk of prothorax yellowish-white; anterior and posterior suture of pleura, space around scutellum, and spot on each side of metathorax at extreme tip, black; metathorax rounded, with two fine transverse subarcuate carinæ, between which the space is obliquely finely aciculate, apex longitudinally striated; wings pale yellowish-hyaline, beautifully iridescent, a band beneath base

of stigma, another beneath apex, and the apical margin dusky, apical margin of posterior pair dusky, stigma pale yellowish, blackish at tip; legs slender, uniformally ferruginous, posterior tarsi yellowish, dusky at tips; abdomen more or less tinged with fuscous. Length 4¼ lines.

Orizaba. Closely allied to *cestus*, Say, but quite distinct.

10. **Cryptus xanthostigma.**

Cryptus xanthostigma, Brullé, Hym. p. 190.

Mirador. One ♂ specimen.

Genus JOPPIDIUM, Walsh.

The species of this genus are slender in form, especially that of the ♂, the legs slender, the posterior pair unusually long; the antennæ of ♀ often thickened before the apex, somewhat as in *Joppa;* the wings ample and in the Mexican species, so far as known, entirely blackish; the abdomen more slender than in *Cryptus*, the first segment being long and linear.

The three Mexican species are closely allied and may be separated by the characters given in the following table:—

Body black; all the tibiæ and tarsi yellow..... 1. **dubiosum.**
Body ferruginous; metathorax, hind coxæ, first abdominal segment ♀, and whole of abdomen ♂, black..... 2. **ardens.**
Body entirely ferruginous..... 3. **donabilis.**

1. **Joppidium dubiosum**, n. sp.

♀.—Shining-black; head entirely ferruginous, as well as base of antennæ, the middle of which is orange-yellow, and the apical third black; anterior legs entirely, most of intermediate femora, four posterior tibiæ and tarsi, bright yellow; wings black, with a strong purple reflection. Form slender; antennæ longer than head and thorax, slightly thickened before apex, the third, fourth, and fifth joints long and subequal; mesothorax with the dorsal lines well impressed, with a shallow longitudinal impression down the middle and also on each side over tegulæ; scutellum triangular, convex at tip and deeply excavated at base; metathorax transversely striated except at base which is smooth, and the sides which are punctured; wings ample, areolet rather large, 5-angular; legs long and slender, especially posterior pair; abdomen slender, fusiform beyond first segment, which is long and

linear, being very slightly broader at tip, stigmatic tubercles prominent and placed a little behind the middle; ovipositor more than half the length of abdomen. Length 6½ lines.

♂.—Antennæ long, filiform, attenuated to tips, black, with a yellowish annulus beyond middle, scape dull honey-yellow; vertex and occiput black; abdomen very slender, subcompressed towards apex; otherwise as in ♀. Length 6½ lines.

Cordova. (Sumichrast, No. 58.) The ♀ is closely allied to that of *rubriceps*, Walsh, but distinct by the very different sculpture of the metathorax. The males of the two species are very distinct.

2. Joppidium ardens, n. sp.

♀.—Ferruginous; metathorax, four posterior coxæ, posterior trochanters, base of their femora, basal segment of abdomen, base of second segment, and sheaths of ovipositor, black; sometimes the metathorax is varied with ferruginous; antennæ colored as in *dubiosum* except that the yellow is confined to an annulus about the middle; intermediate tibiæ, and posterior tarsi except tips, yellow; tips of all the tarsi dusky. Same form as *dubiosum*, compared with which the mesothorax has the dorsal lines more deeply impressed, and the intervening shallow depressions are wanting, while the transverse striæ on metathorax are confused on the disk and the sides are finely striated, areolet of anterior wing larger, the abdomen rather more slender, the first segment with a shallow depression above between stigmatic tubercles; ovipositor longer. Length 6½–7 lines.

♂.—Antennæ black, with a narrow yellowish annulus beyond middle, scape ferruginous; metathorax smooth and shining, the apex above having a few irregular transverse striæ; posterior legs black, basal joint of their tarsi white, apex fuscous or black; abdomen sometimes entirely black, generally the second and following segments have a dull ferruginous median or basal band. Length 6½–7 lines.

Cordova; Isthmus of Tehauntepec. (Sumichrast, No. 34 ♀, 56 ♂.)

3. Joppidium donabilis, n. sp.

♂ ♀.—Uniformly ferruginous; face of ♂ pale; antennæ black, with a broad, very distinct white annulus; metathorax transversely striated, with two transverse arcuate carinæ, flanks of ♂

smooth; wings colored as is preceding species; basal joint of posterior tarsi pale yellowish; abdominal segments slightly varied with dusky, sometimes the second and third segments are distinctly marked at base with black. Length 6½–7 lines.

Cordova. (Sumichrast, No. 53.) Distinguished from the two preceding species by the uniform ferruginous color, and by the black antenna having a distinct broad white annulus.

Genus PHYGADEUON, Grav.

1. **Phygadeuon satageus**, n. sp.

♀.—Clothed with short pale pubescence; head black, mouth piceous, palpi white; antennæ black, a broad complete annulus about the middle, and the two basal joints white; prothorax, mesothorax, scutellar region, and anterior margin of pleura, black; anterior and posterior margin of prothorax, tegulæ, a line beneath, most of the pleura laterally, an oblique line on each side before the scutellum, and the scutellum, white; metathorax, and the coxæ and trochanters, pale-testaceous, wings hyaline, nervures; and stigma pale testaceous; legs and abdomen pale honey-yellow, dilated portion of abdomen darker; tips of tarsi dusky. Antennæ and legs rather robust; head transversely quadrate; metathorax with sharply defined elevated lines forming on the dorsal surface an elongate central area, and two subquadrate ones on each side; posterior portion truncate, with a short tubercle on each side on the verge of the truncation; areolet 5-angular; abdomen fusiform when viewed from above, slender at base, smooth and shining, ovipositor about as long as the first segment of the abdomen. Length 3½ lines.

Cordova. (Sumichrast, No. 68.)

2. **Phygadeuon zapotecus**, n. sp.

♂.—Black; clothed with a short, golden pubescence, very dense on face and metathorax; scape and broad annulus on flagellum pale yellow, first joint of the latter honey-yellow; palpi, tegulæ, and four anterior coxæ and trochanters, whitish; legs and abdomen, except first segment, honey-yellow, tip of the latter with a yellowish stain; wings hyaline, tinged with yellowish, subiridescent, nervures and stigma brownish, the former pale yellow at base. Head and thorax large, robust, abdomen small; vertex and face strongly punctured; antennæ as long as body, filiform,

basal joints of flagellum long, subequal; thorax gibbous, feebly punctured, shining; scutellum flat, metathorax opaque, with well-defined elevated lines, apex truncate; wings ample, areolet 5-angular; legs slender; abdomen elongate, flattened, petiolate, smooth and polished. Length 3½ lines.

Orizaba.

Genus MESOSTENUS, Grav.

Subgenus POLYCYRTUS, Spinola.

This subgenus is distinguished by having a single spine or tubercle on the front, behind the antennæ. The form is long and very slender in all the species; the three regions of the mesothorax prominent; the first abdominal segment long, slender, and gradually but not broadly dilated at apex; and the areolet of anterior wing closed.

The species may be tabulated as follows:—

Abdomen black, banded with white or yellowish:
- Metathorax with cruciform black mark above:
  - Second abdominal segment with a white sublunate mark on each side, and third segment with a white lateral spot..... 1. **melanoleucus.**
  - Sides of second and third segments broadly margined with white. 2. **ferox.**
- Metathorax with a central black stripe, often dilated medially and crossed by a slender line near base:
  - Second abdominal segment with a subtriangular white mark on basal middle, and an elongate white mark on lateral margin.... 3. **major.**
  - Second abdominal segment with a sublunate mark on each side and lateral margin, white..... 4. **acerbus.**
  - Second abdominal segment with a large, acute, cruciform mark on basal middle and a spot on lateral margin, white..... 5. **macer.**
  - Second abdominal segment with an irregular, transverse, central mark near base..... 6. **mancus.**
  - Second abdominal segment with basal half of lateral margin dilated; metathorax broadly black at base..... 7. **paululus.**
- Metathorax with two black spots at base, and a central black stripe. 8. **junceus.**
- Metathorax with three black stripes, the lateral ones confluent at base, the central one short; mesothorax with a central white spot. 9. **reliquus.**
- Metathorax entirely honey-yellow, sometimes stained with fuscus at base above..... 10. **copiosus.**

Abdomen luteous, most of first and base of second and third segments black; metathorax and pleura honey-yellow, the former with a blackish stain at base ..... 11. **accuratus.**

Abdomen black on basal half; head, prothorax, and mesothorax black; only the clypeus and mandibles white; pleura and sides of metathorax honey-yellow, the latter fuscous above; posterior femora black, their tibiæ and tarsi bright yellow ..... 12. **furvus.**

Abdomen honey-yellow:

Metathorax with a central black stripe; abdomen entirely pale honey-yellow ..... 13. **univittatus.**

Metathorax entirely pale honey-yellow; abdominal segments paler at apex ..... 14. **pallidus.**

Abdomen and thorax vermilion-red; basal margin of third and following segments blackish; head, except mouth, entirely black. 15. **atriceps.**

1. **Polycyrtus melanoleucus.**

Mesostenus (*Polycyrtus*) *melanoleucus*, Brullé, Hym., p. 204, ♂.

♀.—Black; face, mouth, orbits broad on cheeks, broad annulus on antennæ, collar, prominent upper margin of prothorax, two short discal lines on mesothorax, a line on posterior margin before scutellum, tegulæ, spot on apex of scutellum and postscutellum, from each side of which diverge a narrow line to base of wings, pleura, except two or three black lines or spots, white; metathorax white, a large cruciform mark on the disk, the transverse bar very broad, a spot covering the spiracles and continued posteriorly in a narrow line, a spot on each side above posterior coxæ, and the basal suture, black; legs yellow, coxæ whitish, the two posterior pair with a black stripe on outside, all the femora with a black stripe above, the four anterior tibiæ above, their tarsi entirely, and base of posterior tibiæ fuscous; wings hyaline, nervures black; abdomen above black, sides and apex of first segment, apex and a sublunate spot on each side of second, broad apical and lateral margins of following segments, a transverse line or spot on each extreme side of third segment, and the venter, white. Smooth and shining; frontal spine long and obtuse; antennæ as long as the body; metathoracic spines long and subacute; areolet of anterior wing small, transversely quadrate, closed; abdomen rather robust beyond first segment, which is long and rather squarely dilated at apex. Length 6–6½ lines.

♂.—Much more slender than ♀, with longer antennæ and legs; the transverse bar of the cross on metathorax is broader and subtriangular; the legs have scarcely any tinge of yellowish; the

white spot on lateral middle of second abdominal segment is ovate, and that on third very minute; the wings are tinged with dusky. Length $5\frac{3}{4}$ lines.

Orizaba; Cordova.

2. Polycyrtus ferox, n. sp.

♀.—Black; face, orbits broadly interrupted behind summit of eyes, broad annulus near apex of antennæ, collar, prominent upper margin of prothorax, two short discal lines on mesothorax, and oblique marginal line on each side posteriorly, and the pleura, white; scutellums and metathorax marked as in *melanoleucus*, except that the transverse of the cross is confluent with the stigmatal spot and lateral stripe; wings hyaline or subhyaline, nervures black; legs as in preceding species, rather darker colored and with the tibiæ entirely yellow; lateral and apical margins of abdominal segments, white, varying in breadth on different segments. Elongate, slender, smooth and shining, more slender than *melanoleucus;* frontal spine robust, obtuse; metathoracic spines obtuse; areolet elongate quadrate, narrow, closed; legs and abdomen long, slender; second segment smoothly depressed before base, narrower than in preceding species. Length 7 lines.

Orizaba.

3. Polycyrtus major, n. sp.

♀.—Black; head, antennæ and thorax as in *melanoleucus;* metathorax pale luteous, with a black central stripe dilated medically, crossed near base by a slender line, confluent with spot covering spiracles and then with lateral stripe, basal suture narrowly black; wings hyaline, faintly tinged with fuscous, nervures blackish; legs yellow, posterior coxæ with black stripe, femora brownish-yellow above and within, with a blackish stripe above, four anterior tarsi and apical joint of posterior pair black; first three abdominal segments black above, apical and lateral margins of first, second, and third segments, very broad on the latter, a triangular spot on basal middle of second segment, the lateral margin of which is triangularly dilated near base, white; lateral margin of third segment suddenly abbreviated near base; remaining segments white, with narrow basal margins black. Smooth, shining; form much as that of *ferox*, with abdomen rather more robust, and second segment shorter, broader and

scarcely depressed near base; frontal spine subacute, as are also the mætathoracic spines. Length 8½ lines.

Orizaba.

4. **Polycyrtus acerbus, n. sp.**

♀.—Black; head, antennæ, thorax, and legs marked as in *major;* posterior tarsi white, with base yellow and claws black; wings hyaline, nervures brown; first segment of abdomen white, with a narrow central black line above, interrupted near base and broadly dilated near apex; second and following segments black, with broad apical and lateral white margins; second segment with sublunate white spot on each side and the third with small white spot on lateral middle. Form slender; head, thorax and abdomen smooth and shining, metathorax rugose, opaque; frontal spine short and obtuse; metathoracic spines flat; abdomen robust beyond first segment; areolet small, quadrate, closed. Length 6 lines.

Orizaba. Closely resembles *melanoleucus*, but easily distinguished by the markings and sculpture of the metathorax.

5. **Polycyrtus macer, n. sp.**

♂ ♀.—Head, antennæ, prothorax, and mesothorax black; face, mouth, orbits, broad annulus on antennæ, collar and spot on each side before tegulæ, two oblique lines before scutellum, tegulæ, apex of scutellum and postscutellum, with slender lines leading to base of wings, and spot beneath tegulæ, white; pleura and metathorax tinged with yellowish, anterior margin of pleura, extending beneath, basal suture of metathorax, a broad central stripe and a slender one on each side, the former crossed by a short slender line; black; wings hyaline, faintly dusky on apical margin, nervures black; legs dull luteous, trochanters and femora more or less tinged with fuscous, tibiæ yellow, four anterior tarsi blackish, posterior pair white, with black claws; abdomen black above, first segment white, with a subapical black spot, remaining segments with rather broad apical, and uneven lateral white margins, the second with a long acute mark at base, sometimes cruciform. Long and slender, rather smooth and shining, pubescent; frontal horn very short and acute; metathoracic spines short and obtuse, antennæ as long as body; areolet minute, closed; abdomen long, slender, subcylindrical in ♂. Length 6 lines.

Cordova. (Sumichrast, No. 109.)

6. **Polycyrtus mancus**, n. sp.

♀.—Very much like *macer*, differing as follows: Size smaller; the mesothorax has two short white discal lines; the scutellum is entirely white; the transverse bar of the cruciform black mark on metathorax is abbreviated laterally and not confluent with stigmatal spot; the second abdominal segment has a transverse white mark near the base; otherwise as in *macer*. Length $4\frac{3}{4}$ lines.

♂.—In this sex the central black stripe on metathorax is slender, being dilated between the spines, crossed by a slender line near base and confluent on each side with stigmatal spot.

Orizaba.

7. **Polycyrtus paululus**, n. sp.

♀.—Head, antennæ, and mesothorax black; face, mouth, orbits, broad annulus on antennæ, collar, line before tegulæ, two short discal lines on mesothorax, two oblique lines before scutellum, tegulæ, scutellum except basal excavation, and spot on postscutellum, white; pleura and metathorax whitish, basal suture of the latter and three narrow longitudinal stripes, black; legs pale honey-yellow; wings hyaline, iridescent; abdomen above black, apical margin of all the segments white. Small, slender, smooth and shining; frontal spine short and acute; metathorax rugulose down the middle, the spines long and acute; abdomen very slender at base, gradually dilated towards apex; areolet minute, closed. Length 4 lines.

Cordova. (Sumichrast, No. 134.)

8. **Polycyrtus junceus**, n. sp.

♂.—Black; face, mouth, orbits, interrupted behind, apex of frontal spine, broad annulus on antennæ, collar, spot on each side before mesothorax, tegulæ, scutellum except base and central spot, confluent with an oblique line on each side extending nearly to tegulæ, and apex of postscutellum, white; pleura and metathorax whitish, the latter with two nearly confluent spots at base to transverse carina and then a central black line dilated at each end; wings hyaline, faintly fuscous at apex, nervures black; legs yellowish, four posterior coxæ with two faint fuscous stripes, the trochanters and femora above, base of posterior tibiæ and the four anterior tarsi, blackish; abdomen black above, lateral and apical margins of all the segments white, becoming broader on

apical segments. Form slender, smooth and shining; metathorax and pleura unusually pubescent; frontal spine long and acute; metathoracic spines rather obtuse; antennæ very long, slender; areolet minute, closed; abdomen very slender, subcylindrical. Length 5½ lines.

Orizaba.

9. Polycyrtus reliquus, n. sp.

♂.—Black; face, clypeus, labrum, spot on mandibles, orbits broad on cheeks, palpi, broad annulus near apex of antennæ, collar above, line on each side before tegulæ, spot on disk of mesothorax, two spots before scutellum, tegulæ, transverse spot beneath, spot on scutellum, another on postscutellum, pleura beneath and a large oblique mark on each side, yellowish-white; metathorax yellowish-white, with three black stripes, the lateral ones confluent at base, the central one abbreviated anteriorly; wings hyaline, iridescent, apex faintly dusky, nervures black; legs yellow, coxæ yellowish-white, the two posterior pair with a black stripe; four anterior femora above, the posterior pair on the outside and within, base of their tibiæ and tips of all the tarsi, black; abdomen black, first segment except large spot before apex, apical margin of all the remaining segments, and large transverse spot at base of second segment, white. Shining; mesothorax pitted; metathorax transversely rugose, without tubercles or spines; abdomen long and slender, smooth and shining; antennæ as long as body; frontal horn long and acute; areolet very minute, closed. Length 6½ lines.

Orizaba.

10. Polycyrtus copiosus, n. sp.

♀.—Head; antennæ, prothorax and mesothorax black; middle of face, orbits interrupted behind, clypeus, spot on mandibles, apex of frontal horn, broad annulus on antennæ, collar, line on each side before tegulæ, two oblique lines before scutellum, tegulæ, apex of scutellum and slender lines leading to base of wings, white; pleura, metathorax and legs luteous; metathorax often more or less dusky from the base to spines; four anterior tarsi blackish, posterior trochanters and femora more or less dusky above, their tibiæ shading into yellow, and their tarsi paler; wings hyaline, nervures fuscous; first abdominal segment dull luteous, darker towards apex which is white; basal half of second and third seg-

ments black, remainder white, with base of third segment narrowly black; second segment with a white dot on each side near base. Smooth and shining; metathoracic spines very long, slightly recurved at tip which is obtuse; areolet quadrate, closed; abdomen robust beyond first segment; legs and antennæ very long and slender. Length 5½ lines.

♂.—More slender than ♀, with face entirely white, and all the abdominal segments black, banded at apex with white.

Orizaba; Cordova. (Sumichrast, No. 105.) Common.

11. **Polycyrtus accuratus**, n. sp.

♀.—Head and mesothorax black; face orbits, mouth, upper margin of prothorax, two short lines on each lateral lobe of mesothorax, an oblique line on each side leading to scutellum, apex of scutellum and tegulæ, white; antennæ black, with broad white annulus; middle and base of scutellum black; base of metathorax with two nearly contiguous black spots reaching to transverse carina; remainder of thorax luteous; legs luteous, except four anterior tarsi which are blackish; wings hyaline, nervures fuscous; abdomen luteous, paler than rest of body, first segment except apex, base of second and narrow basal margin of third segment, black. Form slender, smooth and shining; frontal horn obtuse; metathoracic spines long and blunt; areolet of anterior wing transversely quadrate, closed; abdomen slender, rather thickly clothed with appressed black pubescence, and at apex beneath with long black hair. Length 5½ lines.

Mirador.

12. **Polycyrtus furvus**, n. sp.

♂.—Head, antennæ, pro- and mesothorax, most of scutellum and posterior femora, black; clypeus, labrum, spot on mandibles, palpi, broad annulus on antennæ, and two slender oblique lines before scutellum, white; pleura metathorax, and four anterior legs, dull luteous; metathorax above and posterior coxæ dark fuscous or blackish; four anterior tibiæ yellow, their tarsi dusky, posterior tibiæ and tarsi pale yellow; wings hyaline, faintly dusky at tips, nervures black; first, second, and base of third segments of abdomen black, the remainder pale brown; narrow apical margin of first segment, broad apical margin, and a short narrow stripe on basal lateral margin of second segment, pale. Form slender, smooth and shining; antennæ longer than body; frontal horn long,

stout, subacute; metathoracic spines long, subacute and slightly recurved; abdomen very slender at base, the first segment with a prominent tubercle before apex; areolet quadrate, closed. Length 5½ lines.

Orizaba.

13. **Polycyrtus univittatus**, n. sp.

♂ ♀.—Head, antennæ, pro- and mesothorax, anterior margin of pleura, spot beneath wings, scutellar region and dilated stripe down middle of metathorax, black; face, mouth, orbits, broad annulus on antennæ, collar, line on each side before tegulæ, tegulæ, spot above, another beneath, scutellum, and two oblique lines in front, white; wings pale fusco-hyaline, nervures brown; remainder of metathorax, legs, and abdomen pale honey-yellow. Slender, smooth and shining; frontal spine very short and acute; middle of metathorax rugulose, and in place of the usual spines there is a prominent transverse carina; legs and abdomen slender, especially of ♂; areolet minute, closed. Length 4–4½ lines.

Orizaba; Cordova. (Sumichrast, No. 97.) Common.

14. **Polycyrtus pallidus**, n. sp.

♂.—Pale honey-yellow; head, antennæ, pro- and mesothorax, black; face, mouth, orbits, frontal spine, very broad annulus on antennæ occupying nearly the apical half, collar, tegulæ, line on each side before, spots on scutellum and two oblique lines in front, white; wings hyaline, nervures pale; metathoracic tubercles, tarsi, and apex of abdominal segments, whitish. Slender, smooth and shining; frontal spine robust, obtuse; metathorax with two blunt tubercles; areolet quadrate, closed; abdomen and legs long and slender. Length 4¾ lines.

Cordova.

15. **Polycyrtus atriceps**, n. sp.

♀.—Bright red, legs paler; head and antennæ black; clypeus and broad annulus on antennæ white; posterior tibiæ yellow, their tarsi whitish; wings hyaline; basal margin of third and following segments blackish. Slender, smooth and shining; frontal and metathoracic spines robust and obtuse; areolet closed. Length 4 lines.

Orizaba.

Subgenus POLYÆNUS.

This subgenus is formed for the reception of two species differing from *Polycyrtus* in having *two* short nearly contiguous spines on the front. The form is also shorter and more robust, the regions of the mesothorax not at all prominent, and the first abdominal segment rather short and broadly though gradually dilated at apex. The areolet of anterior wing is elongate, narrow, and closed.

1. **Polyænus ectypus**, n. sp.

♀.—Black; face, mouth, orbits, collar, tegulæ, spot before, another beneath, apex of scutellum, two oblique lines in front, postscutellum, pleura except anterior margin, metathorax except a broad central stripe crossed near base by a slender line to spiracles, legs, base of first abdominal segment, broad apical and lateral margins of all the segments, and basal corners of second segment, yellowish-white; broad annulus on antennæ pure white; wings hyaline; trochanters, femora above and tarsal tips dusky. Slender, shining; frontal spines short, acute; upper lateral angles of prothorax prominent, tuberculiform; metathorax longitudinally rugose down the middle, the spines prominent, obtuse; abdomen polished; areolet small, narrow, closed. Length 5 lines.

Orizaba.

2. **Polyænus ablatus**, n. sp.

♀.—Black; face, mouth, orbits broadly interrupted behind, tegulæ, spot in front, dot beneath, apex of scutellum, two oblique lines in front, postscutellum, space behind base of wings, flanks of metathorax, two elongate marks on its posterior face covering spines, broad oblique mark on each side of pleura, most of legs, base of first abdominal segment, broad apical and narrow lateral margins of all the segments, and basal corners of second segment, yellowish white; broad annulus near apex of antennæ pure white; wings hyaline; all the coxæ within, four anterior trochanters beneath, the posterior pair except base above, four anterior femora beneath, tips of their tarsi, and posterior femora, except two broad yellow stripes—one outwardly and the other above, black; posterior tibiæ bright yellow. Head and thorax robust, densely and confluently punctured, pubescent; frontal spines short, acute; upper lateral margins of prothorax not so prominent as in *ectypus;*

metathoracic spines long, prominent, obtuse; areolet narrow, closed; abdomen smooth and polished. Length 4¼ lines.

Orizaba.

Subgenus Mesostenus.

In this subgenus the form is much more robust than in *Polycyrtus*. The head has no frontal spine or tubercle; the lobes of mesothorax generally not prominent, often scarcely indicated; the metathorax varies in form, with the spines sometimes long and acute, and sometimes entirely wanting; the areolet of anterior wing, always small, also varies much in shape, and although generally closed, is sometimes open.

The species are numerous and may be separated by the characters given in the following table.

Abdomen black, banded with white or yellow:
- Mesothorax with white discal spot:
  - Metathorax with lateral tubercle or spine:
    - Metathorax with three black stripes, connected by a broad black band at base; posterior coxæ pale fulvous, their femora black within; scutellum white at apex ..... 1. **azteeus.**
    - Metathorax as in *aztecus;* posterior coxæ with broad black lateral stripe, their femora black above and within; scutellum white at apex ..... 2. **propinquus.**
    - Metathorax with three black stripes, connected at base by a narrow black band; posterior coxæ with a narrow black stripe, their femora black above and beneath; second abdominal segment with a transverse whitish mark on basal middle; scutellum white at tip. 3. **compactus.**
    - Metathorax black, with two elongate white spots covering spines, and a large white spot on each flank; posterior coxæ with a subcordate black mark above, their femora trivittate with black; scutellum white ..... 4. **discus.**
    - Metathorax as in *discus;* posterior coxæ with two short black stripes above; their femora bivittate with black; scutellum white. 5. **facilis.**
    - Metathorax black, tubercles and spot on each flank, white; posterior coxæ marked with black, their femora black beneath and at tips; scutellum white ..... 6. **acceptus.**
    - Metathorax black at base, with three slender black stripes; posterior coxæ with lateral black stripe, their femora entirely pale fulvous; second abdominal segment broadly white at base and apex; scutellum white ..... 7. **modicus.**
    - Metathorax fulvous, black at base above; discal spot of mesothorax often furcate anteriorly; legs, except tips of tarsi, fulvous; scutellum white ..... 8. **communis.**

Metathorax without lateral tubercle or spine :

Metathorax black above, with an elongate, subtrefoil, white mark extending to apex ..... 9. **chichimecus.**

Metathorax black above, with two white spots near base, and an elongate, median, white spot dilated at apex ; second abdominal segment with a white dot on basal middle..... 10. **admirandus.**

Metathorax black above, with an arcuate white line at apex ; posterior femora bivittate with black ; scutellum black at tip. 11. **arcuatus.**

Metathorax black above, with a large quadrate white mark on posterior face, inclosing a small quadrate black spot, there is also three small white marks on basal margin posterior coxæ with a black stripe or elongate spot above, their femora with a black stripe above ..... 12. **admotus.**

Mesothorax with two short white discal lines :

Metathorax with three black stripes connected by a broad black band at base ; legs luteous, all the femora black above. 13. **mexicanus.**

Metathorax as in *mexicanus ;* posterior legs black, their coxæ whitish, with a large black spot above, their femora reddish on basal half, and most of their tarsi white ; *antennæ entirely black except scape beneath* ..... 14. **lassatus.**

Metathorax as in *mexicanus ;* legs fulvous, tarsi whitish tipped with black..... 15. **moratus.**

Metathorax as in *mexicanus*, with basal band narrow and inclosing a white spot on each side ; legs as in *moratus ;* second abdominal segment with an elongate white spot on basal middle. 16. **absolutus.**

Metathorax with a broad central stripe, sometimes dilated anteriorly, not reaching basal suture ; legs fulvous, posterior tarsi white, black at base and apex ..... 17. **accolens.**

Metathorax with a subcruciform black mark, the posterior stem broad, the cross-piece triangular, the anterior stem narrow and reaching the basal suture ; legs fulvous, posterior tarsi white, black only at tips. 18. **novatus.**

Mesothorax with a white line on each lateral lobe, and a white spot on each side of middle lobe, which is prominent and grooved medially. 19. **stupidus.**

Mesothorax with a central white stripe..... 20. **abactus.**

Mesothorax black, immaculate.

Metathorax broadly black at base, with three broad black stripes to apex ; posterior femora rufous, black at base and apex, their tibiæ fulvous, their tarsi yellow..... 21. **admonitus.**

Abdomen mostly reddish :

Metathorax black and white :

Abdomen yellowish-red, sometimes black at base.....22. **incertus**

Abdomen yellowish-red, with whitish bands..... 23. **animatus.**

Metathorax and abdomen entirely yellowish red:
Head, pro- and mesothorax, and scutellum black and white. **24. pertenuis.**
Head black, thorax reddish..... 25. **collaris.**
Head, thorax, and abdomen entirely black; four anterior legs and hind tarsi pale ..... 26. **arctus.**

1. **Mesostenus azteeus**, n. sp.

♀.—Black; face, clypeus, spot on mandibles, anterior orbits, cheeks, broad annulus on antennæ, collar, tegulæ, line in front, spot beneath, spot on disk of mesothorax, apex of scutellum, two oblique lines in front, postscutellum, mark behind base of wings, two elongate marks on posterior face of metathorax from spines, covering them, to apex, a large mark on flanks, a large subcuneiform mark on each side of pleura and two subquadrate spots beneath, whitish; wings hyaline, apex dusky, nervures black; legs luteous-yellow, posterior coxæ honey-yellow, four anterior coxæ and base of posterior pair whitish, all the femora within, posterior knees and extreme tips of tarsi, black; abdomen black above, base and apex of first segment, apical margins of the following segments, and a spot on each basal corner of second segment, white or yellowish-white. Large, elongate, robust, thorax opaque, abdomen shining; upper lateral angles of prothorax subtuberculate; metathorax transversely striated behind, the spines prominent, obtuse and slightly recurved; areolet subquadrate, narrow, closed. Length 8 lines.

Cordova. (Sumichrast, Nos. 52 and 55.)

2. **Mesostenus propinquus**, n. sp.

♀.—Marked like *aztecus*, except that the two apical white marks on metathorax are continued for a short distance above the spines, which are not recurved at tip; the pleura is entirely black beneath, the lateral spot with a slender hook beneath, projecting forward; the posterior coxæ are white, with a broad black mark on outside and a smaller one within; the abdomen is more robust, the first segment shorter and more squarely dilated at apex; the upper lateral angles of prothorax are not prominent. Length 6–7½ lines.

♂.—Antennæ rather longer than body; posterior legs very long, with tips of their tibiæ black; abdomen short, narrow, the first segment black, with a narrow central mark and apical margin pale; otherwise like ♀. Length 7 lines.

Cordova. (Sumichrast, No. 78.)

3. **Mesostenus compactus**, n. sp.

♀.—Black; face, clypeus, spot on mandibles, orbits irregular in front and dilated on cheeks, annulus on antennæ, collar, tegulæ, spot in front, another beneath, another on disk of mesothorax, apex of scutellum, two spots in front, postscutellum, two slender lines to base of wings, space behind wings, pleura beneath, spot on each side, two broad stripes on posterior face of metathorax covering spines, and a large mark on flanks, white or whitish; wings hyaline, nervures black; legs luteous yellow, coxæ whitish, spot on posterior coxæ, base and apex of trochanters, four anterior femora above, stripe on upper and lower edge of posterior pair, confluent at base and apex within, black; abdomen black above, base of first segment, broad apical margin of all the segments and three spots at base of second—the central one transverse, the lateral ones sublunate—yellowish-white, the two apical segments have a central black band. Robust, compact, opaque; mesothorax densely and coarsely pitted; metathorax rugose, reticulated; abdomen smooth and shining, robust, first segment squarely dilated at tip; upper lateral angles of prothorax produced into a prominent, robust, subacute spine; metathoracic spines prominent and obtuse; areolet small, quadrate, closed. Length 5 lines.

Orizaba.

4. **Mesostenus discus**, n. sp.

♀.—Differs from *propinquus* as follows: Orbits interrupted behind eyes; scutellum very flat, entirely yellowish-white; without spots in front; the posterior coxæ have a cordate black spot above, confluent with apical suture, their femora have two black stripes above and one beneath, all confluent at base and apex, tips of all their tarsi black; the meso- and metathorax are densely and coarsely rugose, the former finely striated on disk; the areolet is small, quadrate and open; the upper lateral angles of prothorax are prominent. Length 6–6½ lines.

Orizaba.

5. **Mesostenus facilis**, n. sp.

♀.—Very much like *discus*, except that the posterior coxæ have two short black stripes above, and their femora a black stripe on each side above; the tibiæ and tarsi are yellow, the latter tipped with black, the posterior pair lemon-yellow; the abdomen is more

slender; the mesothorax is very irregularly sculptured, the posterior middle longitudinally striated; metathorax reticulated. Length 5¾ lines.

Orizaba.

6. **Mesostenus acceptus**, n. sp.

♀.—Black; middle of face, clypeus, spot on mandibles, palpi, orbits, annulus on antennæ, collar, tegulæ, spot in front, short line beneath, round spot on disk of mesothorax, scutellum, spot on postscutellum, two spots on metathorax covering tubercles, spot on flanks, mark behind base of wings, and large mark on each side of pleura, white; wings hyaline, dusky at apex, nervures black; legs yellow, coxæ whitish, anterior and posterior pairs black at base, the latter also at tip, base of trochanters, all the femora beneath, posterior pair at tips and all the tarsal tips, black; abdomen black above, with all the segments broadly banded at apex with whitish. Robust, opaque; mesothorax rugulose, posterior middle longitudinally striated; metathorax densely rugose, tubercles short, robust and obtuse; legs robust; areolet minute, open; abdomen broad, robust. Length 4–5 lines.

Orizaba.

7. **Mesostenus modicus**, n. sp.

♀.—Black; face, mouth, broad orbits, broad annulus on antennæ, *scape beneath*, collar, tegulæ, line in front, spot beneath, spot on disk of mesothorax, scutellum, two oblique lines in front, postscutellum, mark behind base of wings, most of pleura, flanks of metathorax and two broad stripes on posterior face, white; wings faintly dusky, iridescent, nervures fuscous; legs yellow, coxæ whitish, spot on intermediate pair, line on posterior pair and tips of tarsi, black; abdomen whitish, spot near apex of first segment, a broad mark on middle of second, basal half of third, narrow basal margin of second, fourth and the following segments and narrow apical margin of first segment, black. Slender, somewhat shining; mesothorax feebly punctured; metathorax finely rugose, the tubercles very short and obtuse; areolet minute, very narrow and open. Length 4 lines.

Cordova.

8. **Mesostenus communis**, n. sp.

♀.—Black; narrow orbits, transverse mark on clypeus, labrum, spot on mandibles, annulus on antennæ—incomplete beneath, line

on collar, tegulæ, spot beneath, a furcate mark on disk of mesothorax, scutellum, dot on postscutellum and apical margins of abdominal segments, white or yellowish-white; oblique mark on pleura, space behind base of wings, metathorax except broad black band at base, and the legs, dull honey-yellow; base of trochanters, posterior knees and tips of tarsi, blackish; most of posterior tarsi whitish; wings hyaline, dusky at apex, nervures fuscous. Metathorax rugulose, smooth at base, with two transverse carinæ, the posterior one produced into a prominent flattened tubercle on each side; abdomen very slender at base, the first segment with a small tubercle on each side before apex; areolet minute, open. Length 5½ lines.

♂.—Very slender; annulus on antennæ broader and entire; face white, with two central black dots; two white lines before tegulæ; metathorax without tubercles; tips of posterior tibiæ black, their tarsi white. Length 5 lines.

Orizaba; Cordova; Mirador. (Sumichrast, No. 104.) Common.

9. **Mesostenus chichimecus**, n. sp.

♀.—Black; face, mouth, orbits, and broad annulus on antennæ, white; collar, tegulæ, line in front, spot beneath, cuneiform mark on disk of mesothorax, scutellums, spot beneath posterior wing, pleura except narrow space beneath wings and anterior margin, flanks of metathorax, an elongate, subtrefoil mark on posterior face, base of first abdominal segment, rather broad apical and narrow lateral margins of all the segments, and a dot on lateral margin of second and third segments, yellowish-white; wings hyaline, apical margins narrowly dusky, nervures black; legs yellowish-white, tibiæ and tarsi yellow, stripe on all the coxæ, all the femora above, middle tibiæ above, four anterior tarsi and posterior knees black; seventh segment of abdomen as long as the second, while the fourth, fifth, and sixth are very short; the black space at base of seventh segment much extended, narrowed posteriorly, making the yellowish margin broad laterally and narrow centrally. Densely punctured, subopaque; metathorax rugose, rounded, without tubercles or spines; areolet quadrate, closed; abdomen densely punctured. Length 5½–7 lines.

Orizaba; Cordova. (Sumichrast, No. 87.)

10. **Mesostenus admirandus**, n. sp.

♀.—Black; face, clypeus except tip, labrum, base of mandibles,

orbits, tegulæ, line in front, spot beneath, spot on disk of mesothorax, scutellums, two round spots at base of metathorax, flanks, an elongate mark on posterior face broadly dilated at apex, most of pleura, base and apex of first abdominal segment, apical and lateral margins of remaining segments, and a triangular spot on basal middle of second segment, all pale lemon-yellow; broad annulus on antennæ white; wings hyaline, extreme apex dusky, nervures black; legs yellowish-white, posterior tibiæ and tarsi bright yellow; stripe on outside of all the coxæ, posterior pair within, trochanters above, stripe on anterior femora above, double stripe on middle pair and posterior pair except yellowish stripe on outside, black; four anterior tarsi dusky. Form same as that of *chichimecus*, shining, mesothorax strongly trilobate, sparsely punctured; metathorax transversely rugose; abdomen smooth and shining, sparsely punctured, seventh segment large, as in *chichimecus*. Length 6 lines.

Orizaba.

11. **Mesostenus arcuatus**, n. sp.

♀.—Black; face, clypeus, spot on mandibles, broad orbits interrupted posteriorly, collar, tegulæ, two very short lines before, spot beneath, round spot on disk of mesothorax, scutellum, spot on postscutellum, large mark on pleura, mark behind base of wings, spot on flanks of metathorax, an arcuated line on posterior face, and apical margins of abdominal segments, broad on the three basal and very narrow on the remaining segments, lemon-yellow; broad annulus on antennæ white; legs pale yellowish, the tibiæ and posterior tarsi bright yellow; spot on tips of coxæ, four anterior femora above and within, posterior pair except broad stripe on either side and the four anterior tarsi, black; wings hyaline, apex faintly dusky, nervures black. Subopaque, metathorax obliquely truncate behind, without tubercles or spines, the posterior truncation transversely rugose, the base smooth and shining, and beneath the transverse carina a row of radiating striæ; areolet small, 5-angular, outer nervure hyaline. Length 5½ lines.

Orizaba.

12. **Mesostenus admotus**, n. sp.

♀.—Differs from *admirandus* as follows: The pale color more whitish; the metathorax broadly black at base, with a slender

black line down each side and a subapical black spot, and, instead of there being two round spots at base, there are three, the lateral one transverse, notched behind at the spiracles and confluent with spot on the flanks, the middle one a narrow transverse line bent at right angles posteriorly, the surface smooth with two transverse subarcuate carinæ; the coxæ have an elongate black mark on outside, the posterior pair immaculate within; tips of posterior tarsi black; bands of abdomen white, dilated laterally, base of second segment without spot; the seventh segment large, as in the two preceding species. Length 5½ lines.

Orizaba.

13. **Mesostenus mexicanus**, n. sp.

♀.—Black; face, mouth, orbits interrupted behind eyes, white annulus on antennæ, collar, tegulæ, line before, another beneath, two short discal lines on mesothorax, two oblique lines in front of scutellum, apex of scutellum and postscutellum, large elongate mark on pleura, mark behind wings, two elongate marks on posterior face of metathorax covering spines, a large ovate mark on flanks, posterior coxæ except outward black stripe, base and apex of first abdominal segment, lateral and broad apical margins of remaining segments, white; wings hyaline, apical margins narrowly dusky; legs luteous, tibiæ and tarsi yellowish, all the femora black above. Robust; thorax punctured; metathorax transversely striated behind, the striæ confused or radiating above the spines, extreme base smooth, the spines subacute, prominent; abdomen robust, smooth and shining, first segment squarely dilated at apex, gastrocoeli indicated by a transverse white spot. Length 7 lines.

♂.—More slender, antennæ and legs longer, knees and apex of posterior tibiæ black. Length 6 lines.

Orizaba; Cordova. (Sumichrast, No. 7.)

14. **Mesostenus lassatus**, n. sp.

♂.—Black; face, mouth, orbits, cheeks, scape beneath, collar, tegulæ, dilated line before, dot beneath, two short discal lines on mesothorax, scutellums, space behind base of wings, pleura except anterior margins, flanks of metathorax, two elongate spots on posterior face covering tubercles, coxæ, posterior tarsi, base of first abdominal segment and apical margin of all the segments, white; wings hyaline, iridescent, apical margin faintly dusky;

legs pale honey-yellow, spot on posterior coxæ above, their trochanters, base and extreme apex of their femora, their tibiæ entirely, four anterior tarsi, base and apex of posterior pair, black. Slender; mesothorax closely punctured; metathorax reticulated, tubercles small, robust, blunt; areolet small, 5-angular, open; legs and abdomen long, slender. Length 4 lines.

Orizaba.

15. **Mesostenus moratus**, n. sp.

♀.—Black; face, mouth, broad orbits, broad annulus on antennæ, collar, tegulæ, triangular mark in front and spot beneath, two abbreviated lines on mesothorax, scutellum, two oblique lines in front, spot on postscutellum, oblique spot beneath posterior wings, a larger one behind, two elongate marks on metathorax behind covering spines, a large oblique mark on each flank, coxæ except a short black line on posterior pair, first abdominal segment except subapical spot, basal corners of second segment and broad apical margin of second and following segments, white or whitish; wings hyaline, nervures brown; legs pale honey-yellow, tarsi paler, their tips black. Robust, opaque, mesothorax finely shagreened; metathorax longitudinally rugose, tubercles prominent, blunt; areolet 5-angular, open; basal segment of abdomen broadly dilated at tip. Length 4 lines.

♂.—Very slender; metathorax yellowish-white, a broad band at base continued posteriorly in a slender line for a short distance on each side, and a short stripe on apical middle, black; two lines on each of the four posterior trochanters and extreme base and apex of posterior tarsi (the remainder of which is white) also black; metathoracic spines short and acute. Length 4 lines.

Orizaba; Cordova. (Sumichrast, No. 76.)

16. **Mesostenus absolutus**, n. sp.

♀.—Black; face, mouth, orbits, broad annulus on antennæ, collar, tegulæ, line in front, two short discal lines on mesothorax, scutellum, two oblique lines in front, postscutellum, and pleura, white or yellowish-white; metathorax yellowish-white, with a broad black band at base, inclosing a round whitish spot on each side, from which band three black stripes proceed to the apex; wings hyaline, nervures fuscous; legs honey-yellow, coxæ whitish, the posterior pair with a slender black stripe, four anterior tarsi fuscous, posterior pair whitish with base yellow and apex black;

abdomen black above, first segment except a subapical spot, narrow lateral and broad apical margins of second and following segments and an acute ovate spot on basal middle of second segment, white. Slender, opaque; mesothorax coarsely and confluently pitted; metathorax rugose, tubercles flat and obtuse; abdomen smooth, slender; areolet 5-angular, open. Length 5 lines.

Cordova.

17. **Mesostenus accolens**, n. sp.

♀.—Black; face, mouth, broad orbits, annulus on antennæ, collar, tegulæ, broad line in front, spot beneath, two short discal lines on mesothorax, scutellum, two oblique spots in front, dot on postscutellum, pleura and space behind base of wings, white; metathorax tinged with honey-yellow, tubercles whitish, a broad central stripe dilated at base, and a narrow basal stripe on each side, black; wings faintly dusky, nervures fuscous; legs honey-yellow, four anterior coxæ and spot at base of posterior pair paler, four anterior tarsi dusky, posterior pair white, black at base and apex; abdomen black above, base of first segment honey-yellow, apical margin of all the segments rather broadly white, becoming narrower on apical segments. Opaque, thorax and abdomen smooth, metathorax coarsely rugose, tubercles flat, obtuse; areolet very small, quadrate, open; abdomen slender at base, remainder oblong-ovate. Length $4\frac{1}{2}$–5 lines.

Mirador.

18. **Mesostenus novatus**, n. sp.

♀.—Much like *accolens*, but differs as follows: The annulus on antennæ broader; metathorax longer, the distance between base and tubercles greater, the broad black central mark is subcruciform, and confluent with a triangular spot at base; posterior coxæ entirely honey-yellow, their tarsi yellow at base and black at tips; first abdominal segment with the subapical spot continued to base in a slender line; areolet 5-angular, open; abdomen more elongate and narrow. Length $5\frac{1}{4}$ lines.

Mirador.

19. **Mesostenus stupidus**, n. sp.

♀.—Black; face, mouth, orbits, narrow annulus on antennæ, collar, tegulæ, line in front, spot beneath, two long longitudinal lines on mesothorax interrupted by the impressed lines, scutellum, spot on postscutellum, spot beneath wings, space behind

wings, flanks of metathorax, broad arcuated line on posterior face covering spines, coxæ, posterior tarsi except base and apex, and apical margins of all the abdominal segments, white or soiled white; wings hyaline, iridescent; legs pale honey-yellow, stripe on posterior coxæ, four anterior tarsi and apex of posterior tibiæ, black or fuscous. Metathorax deeply excavate behind, the upper edge carinate and produced on each side into an obtuse tubercle; areolet minute, open; sutures of thorax crenulated, middle lobe of mesothorax with a crenulated central impressed line; antennæ long and very slender. Length 4 lines.

Orizaba. (Sumichrast, No. 61.)

20. **Mesostenus abactus**, n. sp.

♀.—Black; face, mouth, orbits, scape beneath, broad annulus on flagellum, collar, tegulæ, line before, central stripe on mesothorax, scutellum, line on each side before, band behind dilated behind base of wings, flanks of metathorax, two elongate marks on posterior face covering tubercles, pleura except an oblique line beneath wings, coxæ except stripe on outside of posterior pair and their base within, base of first and rather broad apical margin of all the segments, white; wings hyaline; legs pale honey-yellow, tips of all the tarsi black, the posterior pair yellow. Opaque, middle lobe of mesothorax finely aciculated transversely; metathorax rugose, tubercles transverse, very blunt; areolet very minute, open. Length 4 lines.

Mirador.

21. **Mesostenus admonitus**, n. sp.

♂.—Black; face, mouth, narrow orbits, annulus on antennæ, tegulæ, spot in front, another beneath, scutellum except base, spot on postscutellum, space behind base of wings, spot on each flank of metathorax, two elongate marks on posterior face covering spines, four anterior coxæ and trochanters, large spot on posterior coxæ above, tarsi except tips, base of first abdominal segment and apical margin of all the segments, dilated laterally, white or yellowish-white; wings hyaline, nervures black; femora and tibiæ pale honey-yellow, the posterior femora black at base and apex. Head and thorax robust, abdomen slender; mesothorax densely rugose; metathorax rugose, posterior face coarsely reticulated, tubercles flat and obtuse; upper anterior angles of prothorax very

prominent and tuberculiform; areolet minute, open; abdomen smooth and opaque. Length 4½ lines.

Orizaba.

22. **Mesostenus incertus**, n. sp.

♀.—Head, antennæ and thorax, black; face, clypeus, orbits interrupted posteriorly, spot on mandibles, annulus on antennæ, collar, tegulæ, line before, spot beneath, spot on disk of mesothorax, scutellums, two oblique lines in front, oblique mark on pleura, space behind base of wings, two elongate marks on posterior face of metathorax covering spines, a mark on flanks, and four anterior coxæ, white; wings hyaline, apex dusky, nervures black; posterior coxæ, femora, and abdomen honey-yellow, remainder of legs bright yellow; four anterior femora more or less black behind; in one specimen the first abdominal segment is yellow with a large black spot near apex. Upper margins of prothorax prominent; mesothorax punctured; metathorax reticulated at base and sides, transversely striated posteriorly, spines prominent and subacute; areolet quadrate, closed; abdomen smooth and shining. Length 5½ lines.

♂.—Upper lateral angles of prothorax tuberculiform; black spot on middle of scutellum; posterior coxæ with black stripe, their femora entirely black; first and middle of second abdominal segment black, remainder of abdomen dull honey-yellow. Length 4½ lines.

Orizaba; Cordova.

23. **Mesostenus animatus**, n. sp.

♀.—Head, antennæ and thorax black; face except broad mark above clypeus, mouth, clypeus, orbits broad on cheeks, broad annulus on antennæ, collar, tegulæ, line before, spot beneath, two short discal lines on mesothorax, scutellum, two oblique lines in front, spot on postscutellum, space behind base of wings, flanks of metathorax, two elongate marks on posterior face covering tubercles, large mark on each side of pleura, four anterior coxæ and trochanters, spot at base of posterior coxæ and their tarsi except extreme base and apex which are black, all white; wings hyaline, nervures fuscous; legs and abdomen pale honey-yellow, base and apex of first and apical margins of second, third, and fourth segments whitish. Smooth, shining; mesothorax strongly trilobate; metathorax rugulose, with two transverse carinæ, the posterior

one very prominent on each side; abdomen polished, slender at base and then oblong-ovate; areolet very minute, open; antennæ long and very slender. Length 3½ lines.

Orizaba.

24. **Mesostenus pertenuis**, n. sp.

♂.—Honey-yellow; head, antennæ, pro- and mesothorax, scutellar region and anterior portion of pleura beneath, black; face, mouth, orbits, annulus on antennæ, collar, tegulæ, line before, spot beneath confluent with anterior margin of pleura, spot on disk of mesothorax, apex and sides of scutellum, two oblique lines in front, spot on postscutellum, pleura beneath, four anterior coxæ and trochanters, and posterior tarsi except base and apex, white; wings hyaline, iridescent, apex faintly dusky; tips of posterior tibiæ dusky, base and apex of their tarsi black. Slender, shining, feebly punctured; metathorax rounded, without tubercles; abdomen long, very slender throughout; areolet very minute, closed. Length 4½ lines.

Cordova.

25. **Mesostenus collaris**, n. sp.

♂.—Honey-yellow; head, antennæ, prothorax, sutures of mesothorax, spot behind anterior coxæ, and space on each side of scutellum, black; face, mouth, orbits, annulus on antennæ, margins of prothorax, tegulæ, spot beneath, two dots in front of scutellum, spot on postscutellum, metathoracic tubercles, four anterior coxæ and trochanters, and second, third and fourth joints of posterior tarsi, white; wings hyaline, iridescent; posterior tibiæ dusky toward tips, basal and apical joints of their tarsi fuscous. Small, slender, opaque; metathorax coarsely reticulated, tubercles short, robust and obtuse; areolet minute, open. Length 3 lines.

Orizaba.

26. **Mesostenus arctus**, n. sp.

♂.—Black; clypeus, spot on mandibles, palpi, four anterior coxæ and trochanters and posterior tarsi except base and apex, white; four anterior legs pale honey-yellow; wings hyaline, iridescent, dusky at tips. Small and very slender, especially the antennæ, legs, and base of abdomen; mesothorax densely and coarsely granulated; metathorax coarsely reticulated, without prominent tubercles; areolet quadrate, closed; first abdominal segment narrow, of uniform width, with a prominent tubercle on

each side between middle and apex, apical segments dilated and subcompressed. Length 3½ lines.

Orizaba.

Subgenus CHRISTOLIA, Brullé.

The form of the species belonging to this subgenus is robust, especially that of the head and thorax, the latter is gibbous, the metathorax short and broad, with the tubercles short and blunt, the legs more robust than usual, and the abdomen short, and broad ovate in ♀; areolet minute and open.

Body black, abdomen silvery-sericeous at apex.
- Anterior wings with a median fuliginous subquadrate mark and apex dusky; tibial spurs black..... 1. **nubecula.**
- Anterior wings hyaline, dusky only at apex; tibial spurs white. 2. **calcarata.**

Body black, marked with white or yellowish.
- Posterior femora black above.
  - Metathorax with two round yellow spots covering tubercles; posterior tarsi black beyond basal joint..... 3. **zapotecus.**
  - Metathorax with two large subquadrate yellowish marks on posterior face; posterior tarsi entirely yellow..... 4. **mirabilis.**
- Posterior femora yellow, black only at extreme base and apex. 5. **mirandus.**

Body black, abdomen and legs red..... 6. **abdominalis.**

1. **Christolia nubecula**, n. sp.

♀.—Black, opaque, subsericeous, third and following segments of abdomen strongly silvery-sericeous; annulus on antennæ above and apical segment of abdomen above, white; wings hyaline, apex dusky, an irregular brown spot on middle of anterior wing, nervures and stigma black; anterior tibiæ and tarsi pale brown. Antennæ nearly as long as body, apex robust; thorax strongly gibbous; mesothorax with some longitudinal wrinkles on each side of middle; scutellum small, convex, smooth and polished, sides strongly carinate; metathorax large, broad, depressed behind, reticulated, sides transversely striated, on each side above a short, very obtuse tubercle, stigmata large and ovate; legs slender, posterior pair unusually long; wings long, narrow, areolet small, quadrate, outer nervure obsolete; abdomen short, strongly arcuate, first segment slender, nearly as long as all the remaining segments, slightly and squarely dilated at tip, smooth and polished, stigmatic tubercles prominent and placed between middle and apex;

remaining segments together broad, fusiform, smooth, shining; ovipositor slender, longer than first segment, sheaths slightly thickened at tips. Length 5½ lines.

Orizaba.

2. **Christolia calcarata**, n. sp.

♂.—Black, opaque, subsericeous; face, anterior orbits, clypeus, metathoracic tubercles and tibial spurs, white; wings hyaline, faintly dusky at tips, nervures and stigma black; anterior legs palish in front; apex of first obscurely, and the fifth and following abdominal segments margined posteriorly with yellowish. Form same as that of *nubecula*, with more slender abdomen; antennæ nearly as long as body, filiform, slenderer at tips: mesothorax finely and densely punctured; scutellum convex, shining, sides subcarinate, lateral region longitudinally striated; metathorax subexcavate behind, reticulated, the lateral tubercles short and very obtuse; areolet as in *nubecula;* abdomen smooth and polished, strongly clavate, first segment long and slender, dilated at apex, stigmatic tubercles prominent. Length 4–5 lines.

Orizaba. (Sumichrast, No. 61.)

3. **Christolia zapotecus**, n. sp.

♀.—Black; sides and middle of face, most of clypeus, labrum, anterior orbits, cheeks, annulus on antennæ interrupted beneath, tegulæ, spot on each side in front, spot beneath, two short discal lines on mesothorax, scutellum, two oblique lines in front, spot on postscutellum, spot behind base of wings, two round spots on metathorax covering tubercles, round spot on each flank, an oblique mark on each side of pleura hooked posteriorly, coxæ, spot on middle of first abdominal segment and apical margin of all the segments, white or yellowish; wings hyaline, dusky at apical margins, nervures black; legs strongly yellowish, posterior coxæ at base beneath, and short line or spot at apex above, their trochanters, all the femora above, apex of posterior pair and of all the tarsi, black. Form very robust, compact, opaque; mesothorax densely sculptured; metathorax broad, sloping rapidly behind, reticulated, tubercles very short, robust and blunt; legs long and robust; abdomen smooth; areolet small, subquadrate, open. Length 6 lines.

♂.—Differs from ♀ as follows: Antennæ entirely black; posterior coxæ beneath and apex above, their trochanters, femora, apex

of tibiæ and tarsi entirely, black, four anterior femora entirely yellow; abdomen short and very slender, the first segment entirely yellow except subapical black spot. Length 5 lines.

Orizaba. (Sumichrast, No. 22).

4. Christolia mirabilis, n. sp.

♀.—Head, antennæ and thorax marked as in *zapotecus*, all the markings except annulus on antennæ which is pure white, lemon-yellow; pleura yellow beneath; metathorax with two large subquadrate lemon-yellow marks on posterior face covering tubercles, as well as a large ovate spot on flanks; legs lemon yellow, a broad stripe on outside of posterior coxæ, trochanters above, all the femora above, four anterior tibiæ except tips, and their tarsi, and *basal half* of posterior tibiæ, black; abdomen black, narrow lateral and broad apical margins of three basal segments, and the remaining segments except a narrow transverse black band at base, lemon-yellow; wings hyaline, nervures black. Form same as that of *zapotecus;* meso- and metathorax coarsely rugose and more or less reticulated, the latter truncate behind, with short robust, obtuse tubercles; abdomen smooth and polished; areolet open. Length 6 lines.

♂.—Antennæ entirely black; wings dusky at apex; four anterior femora entirely yellow, posterior pair black above and at base and apex beneath, their tibiæ entirely black; otherwise as in ♀. Length 5½ lines.

Orizaba.

5. Christolia mirandus, n. sp.

♀.—Color and markings as in *mirabilis*, except as follows: metathorax has a triangular yellow spot on each side at base; the pleura and also posterior coxæ are marked as in *zapotecus;* the legs are luteous-yellow, apex of four posterior trochanters, posterior knees, apex of their tibiæ and tarsal tips, black. Form more robust, abdomen shorter and broader, being almost oval beyond first segment; metathorax obliquely truncate behind, the tubercles very short and blunt. Length 5½ lines.

Orizaba.

6. Christolia abdominalis, n. sp.

♀.—Head, antennæ, and thorax black; orbits interrupted on each side of insertion of antennæ and behind summit of eyes, clypeus, broad annulus on antennæ, line on collar, tegulæ, spot

in front, another beneath, spot behind wings, scutellum, minute line on postscutellum, two spots on pleura, the posterior one minute, two spots on metathorax covering tubercles, and a spot on flanks, white or yellowish-white; legs and abdomen honey-yellow; four anterior coxæ and posterior tarsi yellow; wings hyaline, apex faintly dusky, nervures black, basal segment of abdomen tinged with fuscous, with a minute pale dot on each apical corner. Form same as that of *zapotecus;* thorax densely and rather coarsely sculptured; metathoracic tubercles short and transverse; abdomen smooth and shining. Length 7 lines.

Orizaba.

Genus CRYPTANURA, Brullé.

In this genus the form is slender; regions of mesothorax scarcely elevated; metathorax without spines or tubercles; legs slender, the posterior pair very long; abdomen slender, the first segment long, straight, slightly and very gradually dilated at tip; areolet of anterior wings small, quadrate or subquadrate, closed.

The species may be separated as follows:—

Abdomen black, with one or more white spots at apex; legs red, most of posterior tarsi white ..... 1. **Sumichrastii.**

Abdomen black, with narrow white bands; pleura, metathorax, and legs red ..... 2. **delecta.**

Abdomen red, the first, and base of second and third segments black. 3. **acolhua.**

Abdomen yellow, banded with black; anterior wings with a fuliginous spot at tip of marginal cell ..... 4. **pachymenæ.**

1. **Cryptanura Sumichrasti,** n. sp.

♀.—Black, sericeous; labrum, extreme base of mandibles, palpi, broad annulus on antennæ (spotted beneath with black), spot on scutellum, postscutellum, posterior tarsi except base and apex, one or more spots on apex of abdomen above, and most of venter, white; legs, including four posterior coxæ, and more or less of the first abdominal segment, bright rufo-ferruginous; anterior coxæ white in front, black on the sides and behind; anterior legs and intermediate tibiæ and tarsi somewhat luteous; posterior tibiæ except base, base of their tarsi and tips of all the tarsi, blackish; wings faintly dusky. Mesothorax finely and closely punctured, the dorsal lines well impressed; scutellum triangular, deeply excavated at base, with the sides acutely carinate, the

lateral region longitudinally, somewhat obliquely striated; metathorax clothed with a silvery pubescence, more dense on sides and apex, basal third almost smooth, bounded posteriorly by a sharp transverse carina which is angulate on the disk, the remaining portion transversely, irregularly striated, subtruncate behind with a subarcuate carina on each side on the verge of the truncation; metathoracic stigmatæ large and ovate; wing nervures black, the areolet, about the bullæ and at tip of marginal cell dusky; areolet subquadrate, closed; legs long and slender, claws simple; abdomen beyond first segment subfusiform, shining, convex, tip slightly compressed; first segment two-thirds as long as the remainder of the abdomen, slender at base, very slightly broader at apex; ovipositor at least half the length of the abdomen. Length 6–7½ lines.

♂.—Face, anterior legs in front, intermediate coxæ and trochanters beneath, generally a spot on each side of pleura beneath, and a short line beneath tegulæ, white; posterior femora more or less black at apex, their tibiæ generally pale at base; otherwise same coloration as ♀, with the form much more slender, especially of antennæ, legs, and abdomen. Length 5–6 lines.

Orizaba; Cordova. (Sumichrast, No. 1.) Common.

2. Cryptanura delecta, n. sp.

♀.—Black; face, mouth, cheeks, anterior orbits, annulus on antennæ, collar, tegulæ, line before, spot beneath, scutellum, dot on postscutellum, posterior tibiæ except base and apex, and apical margins of abdominal segments, white or whitish; pleura, metathorax except base above, legs and base of first abdominal segment, ferruginous; wings hyaline, nervures black; tips of posterior femora, their tibiæ and base and apex of their tarsi, black. Form elongate, slender; mesothorax finely sculptured; metathorax transversely striated, smooth at base, the posterior transverse carina obsolete centrally and prominent laterally; abdomen narrow, smooth, and shining, with long, slender first segment which is tuberculate on each side behind middle. Length 7½ lines.

Orizaba. (Sumichrast, No. 59.)

3. Cryptanura acolhua, n. sp.

♀.—Black; labrum and palpi yellow; mandibles piceous; an incomplete white annulus on middle of antennæ, and a white dot on tip of scutellum; wings as in *Sumichrasti;* four anterior legs

yellow, their femora behind, all the coxæ and trochanters, and base of posterior femora, fulvous, remainder of their tibiæ yellow; abdomen fulvous, shining, paler at tip and beneath, first segment except base and spot on extreme tip above, base of second segment and basal margin of the third, black. Form same as that of *Sumichrasti*, with the sculpture much the same, the dorsal lines of mesothorax are, however, scarcely impressed; the basal segment of abdomen is polished, while the remaining segments, although shining, are covered with a very short, subsericeous pile. Length 7 lines.

Orizaba. (Sumichrast, No. 5.)

4. Cryptanura? pachymenæ, n. sp.

♂ ♀.—Bright yellow; spot on vertex covering ocelli and occiput, antennæ except base, three stripes on mesothorax—middle one broad, lateral ones slender and abbreviated anteriorly—confluent behind, spot on tip of scutellum, broad band at base of metathorax, short stripe at apex, spot and dot beneath wings, line behind anterior coxæ, base beneath and spot above at apex of posterior coxæ, posterior tibiæ except base, and their tarsi, posterior trochanters above and base and apex of their femora above in ♂, band on middle of second and third abdominal segments, and basal margins of remaining segments indicated only by dusky stains in ♂, black; wings hyaline, with a fuliginous spot at tip of marginal cell. Form slender; eyes large; head flat; mesothorax closely punctured, regions rather prominent; scutellum broad, convex; metathorax rounded above, with a transverse carina near base, posterior face subtruncate and transversely striated; areolet moderate, 5-angular; abdomen very slender at base, smooth and shining, clavate. Length 7 lines.

Var. ♀.—The black color predominates by reason of the markings being more largely developed; stripes on mesothorax broad and confluent; pleura entirely black, except an irregular yellow mark on each side; metathorax black, except the flanks and an arcuated line on posterior face; posterior femora black on their basal half above, and the bands on abdomen broader and more distinct; wings tinged with yellowish. Length 7½ lines.

Orizaba; Cordova; Mirador. (Sumichrast, No. 54.) Parasitic on a species of *Pachymenes*—probably *obscurus* Smith.

Genus HEMITELES, Grav.

Abdomen black, banded with white.
Thorax black, marked with white.
Form short, robust; metathorax rather abruptly truncate behind, tubercles short and blunt; first abdominal segment white, with a black spot before apex..... 1. **lascivus.**
Form elongate, slender; metathorax gradually sloping behind, tubercles short and blunt; first abdominal segment black or red, white at apex..... 2. **patruelis.**
Form long, linear and very slender; metathorax without tubercles; hind coxæ red..... 3. **exilis.**
Form slender; metathorax without tubercles; abdomen clavate; hind coxæ white, black above..... 4. **rarus.**
Thorax ferruginous, mesothorax black above; abdomen black, with a white spot at apex and a pale band at base of third segment. 5. **irritatus.**
Thorax entirely ferruginous; wings hyaline..... 6. **ingenuus.**
Thorax entirely ferruginous; wings hyaline, with two fuscous bands. 7. **adjicialis.**
Abdomen white, banded with black; mesothorax black, with two white stripes..... 8. **adultus.**
Abdomen white and honey-yellow, with one or more black bands.
Metathorax without tubercles.
Mesothorax with two short white lines; metathorax with two oval white spots behind..... 9. **bimaculatus.**
Mesothorax with a central white spot; metathorax white, black only at base..... 10. **centralis.**
Metathorax with tubercles or spines.
Tubercles short, broad and blunt; abdomen honey-yellow, whitish at apex of first and second segments, and a blackish band at base of third segment..... 11. **junctus.**
Tubercles rather long and subacute; abdomen ferruginous, first segment black, base and apex white, also two apical segments, base of second black..... 12. **scitulus.**
Abdomen ferruginous and white.
Head and thorax black; collar, spot on scutellum and on apex of abdomen white; metathorax entirely black..... 13. **monilis.**
Head and thorax black, marked with white; metathorax ferruginous, with two white spots behind; apex of first, narrow apical margin of second and apex of two apical segments white; apex of wings dusky. 14. **admirabilis.**
Head and thorax black marked with white; metathorax black, the flanks and two spots behind white; apex and spot on each side at tip of second segment white, base of first and second segments dusky. 15. **sulsus.**

Abdomen honey-yellow.

Metathorax honey-yellow, with black transverse subbasal carina, and with two prominent white tubercles..... 16. **transilis.**

Metathorax entirely honey-yellow..... 17. **servilis.**

1. **Hemiteles lascivus**, n. sp.

♀.—Black; face, clypeus, palpi, orbits, cheeks, annulus on antennæ, collar, tegulæ, spot before, dot beneath, two short discal lines on mesothorax, scutellum, dot on postscutellum, spot behind base of wings, oblique mark on side of pleura hooked beneath, spot on flanks of metathorax, two spots at tip covering tubercles, coxæ and trochanters, posterior tarsi, base of first abdominal segment, apical margin of all the segments, broad on second, narrow and subinterrupted on remainder, all white or yellowish-white; wings hyaline, apex faintly dusky; legs pale honey-yellow, irregular mark on posterior coxæ and tips of all the tarsi, black. Robust, opaque, finely and densely sculptured; metathorax short, broad, truncate behind, the tubercles longitudinal, not prominent; legs robust; abdomen shining, ovate beyond first segment which is broadly dilated at apex; areolet 5-angular, outer nervure hyaline. Length $3\frac{1}{2}$ lines.

Orizaba.

2. **Hemiteles patruelis**, n. sp.

♀.—Black; face, mouth, orbits, cheeks, scape beneath, broad annulus on flagellum interrupted beneath, collar, tegulæ, line before, spot beneath, two short subtriangular discal lines on mesothorax, scutellum, spot or line on postscutellum, triangular space behind base of wings, pleura except upper and anterior margins, sometimes only a lateral spot, flanks of metathorax, two triangular spots covering tubercles, four anterior coxæ and trochanters, most of posterior tarsi and broad apical margins of abdominal segments, all white; wings hyaline, iridescent, faintly dusky at apex; legs pale honey-yellow, spot on posterior coxæ, the four anterior femora above, their tibiæ and tarsi more or less, posterior trochanters, extreme apex of their femora, and base, and apex of their tarsi, blackish, posterior coxæ within and annulus on base of their tibiæ whitish, and in one specimen the posterior coxæ are white with the base beneath and a lateral stripe black; sometimes the basal segments of the abdomen have a reddish tinge before the white bands. Opaque; metathoracic tubercles very

short and blunt; areolet 5-angular, outer nervure hyaline. Length 3–3½ lines.

Orizaba.

3. **Hemiteles exilis**, n. sp.

♂.—Black; face, mouth, orbits, cheeks, collar, tegulæ, dot beneath, two abbreviated discal lines on mesothorax, scutellum, spot behind, space behind base of wings, two spots at apex of metathorax, oblique mark on side of pleura confluent beneath with a mark which is acutely notched anteriorly, four anterior coxæ and trochanters, most of posterior tarsi and broad apical margins of abdominal segments, that on basal segment dilated anteriorly on each side as far as the tubercles, white; wings hyaline, iridescent, apex dusky; flanks of metathorax and most of legs honey-yellow; four anterior tarsi and posterior tibiæ behind dusky, apex of posterior tibiæ and base and apex of their tarsi, black. Elongate, slender; metathorax finely sculptured, round, without tubercles or spines, and only one transverse carina at base; areolet 5-angular, open; abdomen flattened, long, narrow, opaque. Length 4 lines.

Orizaba.

4. **Hemiteles rarus**, n. sp.

♂.—Black; face, mouth, orbits, cheeks, scape beneath, collar, prothorax except two lateral black dots, tegulæ, dot beneath, two dots on disk of mesothorax, large round spot on scutellum, space behind base of wings, pleura except large space beneath wings, apex of metathorax divided centrally by a black line, four anterior legs, posterior coxæ at apex and beneath, most of posterior tarsi and apical margin of abdominal segments, all white; posterior femora honey-yellow, their base and apex, their tibiæ except narrow pale annulus near base, and base and apex of their tarsi, black; four anterior femora faintly dusky above; wings hyaline, iridescent, nervures black. Slender; hind legs very long; abdomen clavate, first segment slender, with a tubercle on each side behind middle; areolet 5-angular, open; metathorax rounded, with a single transverse carina above the middle. Length 3 lines.

Orizaba.

5. **Hemiteles irritatus**, n. sp.

♂.—Head, antennæ, mesothorax and abdomen black; face,

mouth, broad orbits, cheeks, scape beneath, broad annulus near apex of flagellum, most of posterior tarsi and spot at apex of abdomen, white; remainder of thorax, most of legs, first abdominal segment except apex and band at base of third segment broadly dilated laterally, pale honey-yellow; scutellum above, basal suture of metathorax, posterior tibiæ except base, and base and apex of their tarsi, black or blackish; mesothorax with two pale spots on disk; wings hyaline, nervures black; four anterior legs pale yellow, their coxæ whitish. Shining; head broad, subbuccate; antennæ long; thorax robust; metathorax opaque, with two transverse carinæ, the posterior one interrupted medially, no tubercles or spines; wings ample, areolet 5-angular, outer nervure hyaline; abdomen long, very slender at base, the first segment squarely dilated at tip. Length $5\frac{3}{4}$ lines.

Orizaba.

6. **Hemiteles ingenuus**, n. sp.

♀.—Head, antennæ and abdomen black; thorax and legs ferruginous; anterior orbits, clypeus, spot on cheeks, broad annulus on antennæ interrupted beneath, collar, dot beneath tegulæ, spot behind base of wings, metathoracic tubercles, anterior coxæ, base of posterior tibiæ, most of their tarsi, apical margins of first six abdominal segments interrupted medially on fifth and sixth, and the seventh segment entirely, white; base of trochanters, apex of posterior femora, their tibiæ, and base and apex of their tarsi black; wings hyaline, faintly dusky at apex. Opaque; metathorax finely rugulose, tubercles prominent and subacute; abdomen long and slender, shining at tip; areolet as usual. Length $4\frac{1}{2}$ lines.

Orizaba.

7. **Hemiteles adjicialis**, n. sp.

♀.—Head, thorax, and legs ferruginous; abdomen and antennæ black; orbits, spot on clypeus, broad annulus on antennæ interrupted beneath, collar, spot beneath tegulæ, dot in front, spot on scutellum, spot behind base of wings, metathoracic tubercles, dot on each flank, dot on posterior margin of pleura, four anterior coxæ above, spot on posterior pair above, base of posterior tibiæ, their tarsi, broad apical margins of first, second, and third abdominal segments, and the two apical segments entirely, white; tegulæ black, with a white spot anteriorly; scape reddish; posterior

tibiæ, and base and apex of their tarsi, blackish; wings hyaline, with the apex broadly, and a cloud across middle before stigma, fuscous. Opaque; thorax densely and minutely sculptured; metathoracic tubercles prominent and obtuse; areolet 5-angular, outer nervure hyaline; abdomen shining. Length 3½ lines.

Orizaba. A very beautiful species.

8. **Hemiteles adultus**, n. sp.

♀.—White or yellowish-white; thorax strongly tinged with yellowish; legs pale honey-yellow; antennæ except broad annulus, mark on middle of vertex covering ocelli and extending on occiput, line on collar above, mesothorax (except a line on each lateral lobe, hooked anteriorly and two small dots on each side of middle lobe), base of scutellum and lateral regions, three narrow stripes on metathorax all connected at base by a broad band which incloses a pale spot on each side, tips of tarsi, spot near apex of first abdominal segment, a broad band near base of second segment, a rather broad band at base of third, and narrow basal margins of remaining segments, black; coxæ yellowish; wings dusky hyaline. Opaque; metathorax rugulose, obliquely truncate behind, the tubercles prominent, obtuse; abdomen shining. Length 4½ lines.

Orizaba.

9. **Hemiteles bimaculatus**, n. sp.

♂ ♀.—Black; head except spot covering ocelli and connected with mark covering most of occiput, broad annulus on antennæ, scape beneath, prothorax except broad posterior margin, tegulæ, line before, spot beneath, another above (wanting in ♂), two short broad lines on disk of mesothorax, scutellum, postscutellum, space behind base of wings, pleura except black spot beneath posterior wings, flanks of metathorax and two ovate spots on posterior face, sometimes much reduced, four anterior coxæ and apical half of first three abdominal segments, white; apex of abdomen and legs pale honey-yellow; basal half of first three segments black, sometimes the apical half of the third segment is honey-yellow; posterior tarsi pale, black at base and apex, their trochanters and apex of their tibiæ dusky in ♂; wings hyaline, iridescent. Shining; metathorax rounded, transversely aciculate above, without tubercles. Length 3½–4 lines.

Orizaba; Cordova. (Sumichrast, No. 124.) Common.

10. **Hemiteles centralis**, n. sp.

♀.—Yellowish-white, legs and abdomen tinged with honey-yellow; large spot on vertex and occiput, antennæ except pure white annulus and scape beneath, mesothorax except quadrate white spot on disk, lateral region of scutellums, broad band at base of metathorax, anterior margin of pleura, tarsal tips, basal half of second abdominal segment and narrow basal margin of three following segments, black or fuscous; wings hyaline; four anterior coxæ and trochanters white. Smooth; head and thorax subopaque, abdomen shining; metathorax without tubercles or spines. Length 3 lines.

Orizaba.

11. **Hemiteles junctus**, n. sp.

♀.—Marked like *bimaculatus* except as follows: no spot above tegulæ; the annulus or antennæ interrupted beneath; the abdomen honey-yellow, with apex of first and second segments pale, and base of the third rather broadly black. More robust than *bimaculatus*, especially the antennæ; the metathorax has two very short blunt tubercles. Length 3¼ lines.

Cordova.

12. **Hemiteles scitulus**, n. sp.

♀.—Head and thorax black, legs honey-yellow, abdomen ferruginous; (antennæ wanting); face, clypeus, orbits, collar, tegulæ, line before, spot beneath, two short discal lines on mesothorax, scutellum, line on postscutellum, space behind base of wings, oblique line on each side of pleura, two spots on posterior face of metathorax covering tubercles, spot on each flank, four anterior coxæ, spot on posterior pair above, base and apex of first abdominal segment, and large spot covering two apical segments, all white; posterior tarsi pale, blackish at tips, wings dusky hyaline; middle of first abdominal segment and base of second blackish. Opaque; metathorax longitudinally rugose, tubercles prominent, obtuse; areolet 5-angular, outer nervure hyaline; abdomen depressed, first segment shining. Length 4½ lines.

Orizaba.

13. **Hemiteles monilis**, n. sp.

♀.—Head, antennæ and thorax black; legs and abdomen ferruginous; annulus on antennæ interrupted beneath, collar, tegulæ, spot on scutellum, metathoracic tubercles and spot at apex of

abdomen white; wings subhyaline, with a dusky spot beneath stigma. Mesothorax shining, with finely impressed lines; metathorax rounded, densely and finely rugose, tubercles short, subacute; areolet 5-angular, outer nervure hyaline; abdomen depressed. Length $3\frac{3}{4}$ lines.

Orizaba.

14. **Hemiteles admirabilis**, n. sp.

♀.—Head, antennæ, pro- and mesothorax, scutellar region and pleura above and anterior margin beneath, black; remainder of pleura, metathorax, legs, and abdomen honey-yellow or pale ferruginous; orbits, middle of face, clypeus, labrum, spot at base of mandibles, annulus on antennæ, collar, tegulæ, spot beneath, two discal lines on mesothorax, scutellum, dot behind, spot behind base of wings, spot beneath wings, two spots at apex of metathorax, anterior coxæ and trochanters, posterior coxæ except base and apex, and apical margins of abdominal segments 1, 2, and 7, white; remainder of seventh segment black; base and apex of posterior tarsi fuscous; wings hyaline, with a fuscous cloud at apex. Opaque; metathorax without tubercles or spines. Length 4 lines.

Cordova.

15. **Hemiteles sulsus**, n. sp.

♀.—Head, antennæ, and thorax black; face, mouth, orbits, scape beneath, broad annulus on flagellum, collar, tegulæ, line before, spot beneath, two short discal lines on mesothorax, scutellum, pleura except anterior and posterior margins, spot on flanks of metathorax, two spots at tip covering tubercles, four anterior coxæ and trochanters, spot on posterior coxæ above, posterior tarsi, apex of first abdominal segment and spot on each apical corner of second, white; legs and abdomen pale honey-yellow; four anterior tarsi, tips of posterior pair, base of first and second segments of abdomen more or less, fuscous; wings hyaline. Slender; opaque; metathoracic tubercles very short and blunt; areolet small, 5-angular, open; base of abdomen slender, beyond which it is oblong-ovate, shining. Length $3\frac{1}{2}$ lines.

Orizaba.

16. **Hemiteles transilis**, n. sp.

♀.—Head, antennæ and mesothorax black; metathorax, legs and abdomen pale honey-yellow; face, mouth, orbits, cheeks, scape

beneath, broad annulus on flagellum, prothorax except black band above, ♀, tegulæ, line before, dot beneath, two short discal lines on mesothorax, scutellum, space behind base of wings, pleura except anterior margin, flanks of metathorax, the tubercles, four anterior coxæ, spot on posterior pair above, and two dots on apex of first abdominal segment, white or whitish; metathorax blackish at base; wings hyaline; tarsal tips black. Mesothorax with well impressed lines; metathoracic tubercles short and blunt; areolet as usual. Length 4 lines.

Orizaba.

17. **Hemiteles servilis**, n. sp.

♀.—Pale honey-yellow; head, antennæ, mesothorax and scutellar region black; face, mouth, orbits, cheeks, broad annulus on flagellum, prothorax except black spot above and one on each side, tegulæ, line before, spot beneath, two stripes on mesothorax slightly interrupted by the impressed lines, scutellum, spot on postscutellum, spot on pleura, two spots at base of metathorax, the tubercles, and four anterior coxæ, white or whitish; wings hyaline, faintly yellowish, nervures pale; sometimes the mesothorax has a reddish tinge; scape of antennæ reddish. Opaque; mesothorax with well impressed lines; metathorax with prominent transversely flattened tubercles; abdomen short ovate beyond first segment, which is smooth and shining; areolet quadrate, outer nervure hyaline. Length 3–3½ lines.

Cordova.

(*To be continued.*)

CATALOGUE OF THE RECENT SPECIES OF THE CLASS BRACHIOPODA.

BY W. H. DALL, U. S. COAST SURVEY.

The following catalogue contains all the species known in a recent state up to the date of writing. The synonymy does not profess to be complete, but only sufficiently so to indicate the history of each species approximately, with a reference whenever possible to at least one good figure.

It is probable that some of the species, especially of the genera *Lingula* and *Discinisca*, may be reduced to the rank of synonyms by a careful comparison of types. I have thought it best to leave this work, however, to some one who may have the opportunity of comparing the specimens themselves. I feel confident, also, that the number of species of *Kraussina* has been exaggerated. With regard to the other groups, they appear to have been sufficiently reduced, and the species here enumerated appear to be well defined. Most of them I have been able to examine critically.

While deprecating the multiplication of specific names on the one hand, on the other the practice, miscalled conservatism, which leads to the confounding of allied but distinct forms, from carelessness in comparison or the want of material for critical examination, cannot be too strongly condemned. Such a course leads to the destruction of that critical exactness which is the basis of all science, and only furthers the convenience of the careless or indolent investigator, at the sacrifice of accuracy, and the great increase of labor for the more careful and painstaking student.

Those who may be led to examine this catalogue carefully will trace the evil effect of both courses in the synonymy of many of the species, and, while absolute accuracy seems unattainable, I may be permitted to hope that herein at least a step has been made in that direction. Great care has been taken with the localities attributed to the several species, and they are believed to be, in the main, correct.

I am under obligations to Mr. George W. Tryon, Jr., for assistance in completing the synonymy.

Class BRACHIOPODA, Cuvier.

Order ARTHROPOMATA, Owen.

Arthropomata, Owen, Encyc. Brit. Ed. viii. xv. art. *Mollusca*, p. 336. 1858.

Brachiopoda, valves articulées, Deshayes, An. s. Vert. Ed. ii. vii. p. 309. 1836.

Palliobranchiata, testa cardine instructa, Van der Hœven, Handb. der Zool. p. 692. 1850.

Apygia, Bronn. Klass. Ordn. Thierr. iii. 1st abth. p. 301. 1862.

Articulata, Huxley, Lect. Class. 1864. Mtr. Class. An. p. 116. 1869.

Family TEREBRATULIDÆ, Dall.

Terebratulidæ, Dall, Bull. Mus. Comp. Zool. iii. No. 1, p. 3. May, 1871.

Subfamily TEREBRATULINÆ, Dall.

Terebratulinæ, Dall, Am. Journ. Conch. vi. p. 101. 1870.

Genus TEREBRATULA, Auct. ex Llhwyd.

Terebratula, Llhwyd, Lith. Brit. Ichn. 1699. Lam. Prod. 1799. Dall, Am. Journ. Conch. vi. p. 101. 1870.

Type *Terebratula perovalis*, Sby. Lam.

1. Terebratula cubensis, Pourtalès.

T. cubensis, Pourt. Bull. Mus. Comp. Zool. i. No. 7. p. 109. 1867. Dall, *loc. cit.* iii. No. 1, p. 3, pl. i. f. 2, 8–16. 1871.

T. vitrea, var. Davidson, Mon. It. Tert. Brach. i. p. 9. 1870. (Not of Born.)

Cuba, Florida reefs.

2. Terebratula Davidsoni, A. Adams.

T. Davidsoni, A. Ad. P. Z. S. p. 314, pl. xix. f. 30. 1867.

T. minor Dav. P. Z. S. p. 302, pl. xxx. figs. 10–12. 1871.

Japan.

3. Terebratula minor, Phil. & Suess.

T. vitrea, var. *minor*, Phil. Moll. Sic. i. 1836.

T. affinis, Calcara. 1845.

T. minor, Dav. An. Mag. Nat. p. 35. 1861. Dall. *loc. cit.* vi. p. 104. 1870.

Mediterranean.

4. Terebratula sphæroidea, Philippi.

T. sphæroidea, Phil. Dav. P. Z. S. p. 302. 1871.

Coast of Portugal.

5. TEREBRATULA UVA, Broderip.

T. uva, Brod. P. Z. S. p. 124, Sby. Thes. Conch. i. p. 353, pl. 70, fig. 53–55, Gray. Cat. B. M. p. 18, Dall, *loc. cit.* p. 104. 1833.

Gulf of Tehuantepec, W. Am.

6. TEREBRATULA VITREA, Born.

Anomia vitrea, Born. Mus. Vind. p. 119. 1780. Gmel. S. N. 3347.

Anomia terebratula, Dillwyn, Cat. p. 294.

Gryphus vitrea, Meg. v. Muhlf. Berk. Mus. p. 64. 1811.

Terebratula vitrea, Sby. Thes. Conch. i. p. 353, pl. 70, figs. 56–59. Dall, *loc. cit.* p. 101, figs. 1–2. Dall, Bull. Mus. Comp, Zool. iii. pl. 1, f. 1.

Mediterranean.

DOUBTFUL SPECIES.

Terebratula transversa, Gld. Proc. B. S. N. H. vii. p. 323. Sept. 1860.

Japan.

Terebratula Malvinæ, D'Orb. Voy. Am. Mer. V. p. 674, No. 779, ix. pl. 85, f. 27, 29.

Falkland Islands.

Genus **TEREBRATULINA**, D'Orbigny.

Terebratulina, D'Orb. Comptes Rendus, xxv. p. 268. 1847.

Agulhasia? King, An. Mag. N. H. Ser. iv. vii. p. 109. 1871.

1. TEREBRATULINA CAILLETI, Crosse.

T. cailleti, Crosse, Journ. de Conchyl. p. 27, pl. i. figs. 1–3. 1865. Dall, Bull. Mus. Comp. Zool. iii. i. p. 10. 1871.

? *T. Michellotina*, Dav. Mon. It. Tert. Brach. i. p. 14. 1870. (Fossil.)

Florida, Tortugas, West Indies.

2. TEREBRATULINA CANCELLATA, Koch.

T. cancellata, Koch, in Kust. Conchyl. Cab. v. vii. i. pl. 26, figs. 11–13. Sby. Thes. Conch. i. p. 358, pl. 71, figs. 93–95.

West Australia.

3. TEREBRATULINA CAPUT-SERPENTIS, Lin.

Anomia caput-serpentis, Lin. Syst. Nat. Ed. xii. 1153. 1767.

Terebratulina caput-serpentis, D'Orb. Ann. Sci. Nat. viii. 67, pl. vii. f. 7, 8, 17. 1848. (Type.)

T. cornea, D'Orb. 1848. l. c.

Anomia pubescens, Lin. S. N. l. c.
T. pubescens, Retz, N. Gen. 15. 1788.
Terebratula caput-serpentis, Sby. Thes. i. p. 343, pl. 68, figs. 1–4; pl. 72, fig. 116.
T. aurita, Fleming, Phil. Zool.
T. costata, Lowe, Zool. Journ. 1825.
T. striata, Leach, Brit. Moll. 1852.
T. Gervillei, S. Wood, An. Mag. Nat. Hist. v. p. 253.
T. marginata, Risso, Ewr. Mer. 1826.
T. quadrata, Risso, l. c.
Anomia retusa, Linn, Syst. Nat. xii. p. 1151. 1767.
Delthyris spatula, Menke, Syn. Ed. 2, 96, etc. etc.
Mediterranean and North European Seas.

4. TEREBRATULINA DAVIDSONI, King.
Agulhasia Davidsoni, King, Ann. Mag. Nat. Hist. 4th ser. vii. p. 111, Feb. 1871, pl. xi. figs. 1–8 (? test, jun.)
Agulhas Bank, South Africa.

5. TEREBRATULINA JAPONICA, Sby.
T. Japonica, Sby. Thes. Conch. i. p. 344, pl. 66, figs. 7–8. 1847.
T. abyssicola, Ad. & Rve. Moll. Samarang, p. 72, pl. xxi. fig. 5. 1850.
T. Cumingi, Davidson, P. Z. S. p. 79, pl. xiv. figs. 17–19. 1852.
T. angusta, Ad. & Rve. Voy. Sam. p. 71, pl. 21, fig. 2. 1850.
T. caput-serpentis, Dav. P. Z. S. p. 302. 1871. (not Linné.)
Gulf of Korea; China Seas; Japan.

6. TEREBRATULINA RADIATA, Rve.
T. radiata, Rve. Conch. Icon. pl. iii. fig. 7, *a*, *b*. 1861.
Gulf of Korea.

7. TEREBRATULINA SEPTENTRIONALIS, Couthouy.
T. septentrionalis, Couthouy, Bost. Soc. Nat. Hist. Journ. vol. ii. p. 55. 1838. Sby. Thes. i. p. 344, pl. 68, figs. 7–8. Binney's, Gould's Inv. Mass. p. 208. 1869.
Northeast Coast of America.

8. TEREBRATULINA UNGUICULA, Carpenter.
Terebratula unguicula, Cpr. P. Z. S. Feb. 14, 1865, p. 201, figs. 1–4. Cooper, Geogr. Cat. Cal. Moll. p. 3.
Northwest Coast of America from the Aleutian Islands to San Diego, Cal.

Genus **WALDHEIMIA**, King.

Waldheimia, King, Perm. Foss. p. 81, 1850, and the majority of authors.

Macandrevia, King, Proc. Dubl. Un. Zool. Bot. As. p. 261. 1859.

Eudesia, King, Perm. Foss. p. 144. 1850.

Gwynia? King, Proc. Dubl. Un. Zool. Bot. As. i. p. 258. 1859 (testa junior).

1. WALDHEIMIA CRANIUM, Müller.

Anomia cranium, Gmelin, S. N. 3347.

Anomia terebratula, Lin. S. N. 1767.

Terebratula cranium, Müller, Prodr. Zool. Dan. p. 209. Rve. Conch. Ic. pl. iii. f. 6. Jeffreys, Brit. Conch. ii. p. 11, v. p. 163. Rve. Journ. de Conchyl. p. 123. 1861.

Terebratula vitrea, Fleming (not Born).

Terebratula subvitrea, Leach, teste Rve.

Terebratula glabra, Leach, Brit. Moll. p. 359, pl. xiv. f. 3–5.

Terebratula plicata, Philipps, Retz. Diss. 1788.

Macandrevia cranium, King (type), Proc. Dubl. Un. As.

? *Terebratula* (*Argiope*) *capsula*, Jeffreys.

? *Gwynia capsula*, King, Proc. Dub. Un. As. i. p. 258, f. 1–5. 1859. Rve. Conch. Ic. pl. x. f. 39 (testa junior).

Waldheimia cranium, Gray, B. M. Cat. p. 58. Dall, Am. Journ. Conch. vi. p. 110. 1870.

Scandinavian and North British Seas.

2. WALDHEIMIA FLAVESCENS, Valenciennes.

Terebratula flavescens, Val. apud Lam. 1819. An. s. Vert. v. vii. p. 330. Rve. Conch. Icon. pl. i. and ii. *a*, *b*. 1861.

T. dentata, Val. Lam. An. s. Vert. l. c. 1836.

T. australis, Q. & G. Voy. Astrol. pl. 85, fig. 1–5. 1832.

T. recurva, Q. & G. l. c.

Waldheimia australis, King (type), Mon. Perm. Fos. p. 145. Davidson, Intr. Brach. p. 65, pl. vi. f. 9, 10.

Waldheimta flavescens, Dall, Am. Journ. Conch. vi. p. 108, fig. 5–9. 1870.

Australia.

3. WALDHEIMIA FLORIDANA, Pourtalès.

Waldheimia Floridana, Pourtalès, Bull. Mus. Comp. Zool. i. No. 7, p. 127. 1868. Dall, Am. Conch. vi. p. 112. 1870. Bull. Mus. Comp. Zool. iii. No. 1, p. 12, pl. i. f. 3, pl. ii. f. 1–3. 1871.

Terebratula septata, Jeffreys, Proc. Roy. Soc. 121, p. 112 (not Philippi, Moll. Sicilia, ii. p. 68. 1844.)
Terebratula septigera, Jeffreys (not Lovèn).
Terebratula peloritana, var. Jeffreys (not Sequenza).
Florida Reefs.

4. WALDHEIMIA GRAYI, Davidson.
Waldheimia Grayii, Davidson, P. Z. S. p. 76, pl. xiv. f. 1–3. 1852. P. Z. S. p. 304, pl. xxxi. figs. 7–8. 1871.
(Not *W. Grayi* of Cpr. and Cala. authors.)
Japan.

5. WALDHEIMIA LENTICULÁRIS, Deshayes.
T. lenticularis, Desh. Mag. Zool. pl. xli. 1841. Sby. Thes. i. p. 360, pl. 72, figs. 108–110.
Waldheimia lenticularis, Gray, B. M. Cat. 58. Dall, l. c. p. 112.
Straits of Fauveau, New Zealand.

6. WALDHEIMIA PICTA, Chemn.
Anomia picta, Chemn. xi. f. 2011, 2012.
Anomia cranium, var. Dillwyn, Cat. p. 295.
Anomia rubra, Wood, Ind. Suppl. pl. ii. fig. 4.
T. picta, Sby. Thes. Conch. i. p. 351, pl. 70, figs. 43–44.
W. picta, Gray, B. M. Cat. p. 59. Dav. P. Z. S. p. 304, pl. xxxi. fig. 10. 1871. Dall, l. c. p. 112.
Japan; Java.

7. WALDHEIMIA RAPHAELIS, Dall.
W. Raphaelis, Dall, Am. Journ. Conch. vi. p. 111, pl. vii. figs. *a–d*. 1870. Dav. P. Z. S. p. 302, pl. xxxi. fig. 9.
Japan.

8. WALDHEIMIA SEPTIGERA, Lovèn.
W. septigera, Lovèn, Index Moll. Scand. p. 29. 1846. Dav. Ann. Nat. Hist. pl. x. fig. 1. 1855. Dall, Bull. Mus. Comp. Zool. iii. pl. i. fig. 4, pl. ii. fig. 9 (not of A. Adams).
W. septata, Jeffreys (not *Terebratella septata*, Phil.)
W. Floridana, Jeffreys (not Pourtalès).
Scandinavian Seas.

9. WALDHEIMIA VENOSA, Solander.
Anomia venosa, Solander, MSS. Mus. Banks, Dixon's Voy. p. 355, pl. xi. 1788. Dav. Ann. Mag. Nat. Hist. xx. pp. 81–83.
Terebratula globosa, Lam. An. s. Vert. v. vii. p. 330. 1819 Reeve, Conch. Icon. pl. ii. fig. 3 *a–c*, pl. 6, fig. 3 *d–e*.

Terebratula Californica, Sby. non Koch.
Waldheimia dilatata, Lam. Reeve, Conch. Ic. pl. ii. fig. 2, *b*, *c*.
Terebratula Gaudichaudi, Blainville, Dict. Sci. Nat. 1824.
Waldheimia physema, Val. Reeve, Conch. Ic. pl. vi. fig. 25 *a–c*.
Terebratula eximia, Philippi, teste Reeve.
Terebratula Kochii, Kuster, Conchyl. Cab. viii.
Terebratula Fontaineana, D'Orbigny, Voy. Am. Mer. v. p. 675, No. 782, ix. pl. 85, fig. 30–31.
Waldheimia venosa, Dav. An. Mag. Nat. Hist. xx. pp. 81–3. Dall, Am. Journ. Conch. vi. p. 109. 1870.

Tierra del Fuego.

Subfamily MAGASINÆ, Dall.

Magasinæ, Dall, Am. Journ. Conch. vi. p. 114. 1870.
Magasina, Gray, B. M. Cat. p. 85. 1853.

Genus TEREBRATELLA, D'Orb.

Terebratella, D'Orb. Pal. Fran. Ter. Cret. iv. p. 110. 1847.
Delthyris, Menke, Syn., Ed. ii. p. 96. 1830. (Not Dalman.)
Ismenia, King, Perm. Fos. p. 245. 1850. (Not King, l. c. p. 81.)

1. TEREBRATELLA BOUCHARDII, Davidson.
T. Bouchardii, Dav. P. Z. S. p. 77, pl. xiv. fig. 4–6. 1852. Gray, B. M. Cat. p. 88. Dall, l. c. vi. p. 123.

Habitat?

2. TEREBRATELLA COREANICA, Ad. & Rve.
Terebratula Coreanica, Ad. & Rve. Voy. Sam. p. 71, pl. xxi. fig. 3. 1850. Rve. Conch. Icon. vii. f. 28, *a*, *b*.
Terebratula miniata, Gld. Proc. B. S. N. H. p. 323. 1861.
Terebratella Coreanica, Dav. An. Mag. N. H. p. 367. 1852. Dall, Am. Journ. Conch. vi. p. 207. 1870. Dav. P. Z. S. p. 304, pl. xxxi. fig. 4–5. 1871.

Japanese and Korean Seas.

3. TEREBRATELLA CRUENTA, Dillwyn.
Anomia cruenta, Dillwyn, Syn. p. 295. 1817.
Terebratula rubra, Sby. Thes. Conch. i. pl. lxviii. f. 9–11.
Terebratula zelandica, Desh. Mag. Zool. pl. 42. 1841. Dav. An. Nat. Hist. p. 367. 1852. Sby. Thes. i. pl. 72, figs. 111–113.

Terebratula sanguinea, Leach, Zool. Misc. pl. 76. Lam. An. s. Vert. vi. p. 243.

Terebratella cruenta, Gray, B. M. Cat. p. 89. Dall. Am. Journ. Conch. vi. p. 117. 1870.

New Zealand.

4. TEREBRATELLA DORSATA, Gmelin.

Anomia striata magellanica, Chem. Conch. Cab. vi. viii. p. 101, pl. 78, fig. 710, 711.

Terebratula dorsata, Lam. An. s. Vert. v. vii. p. 331. 1819. Sby. Thes. i. p. 346, pl. 68, f. 15–17.

Anomia dorsata, Gmelin, S. N. 3348. 1788.

Delthyris dorsata, Menke, Syn. Ed. 2, p. 96. 1830.

Terebratula chilensis, Brod. P. Z. S. p. 134. 1836.

Terebratula magellanica, Reeve, Conch. Icon. pl. v. fig. 21 *a–d.*

Terebratula bilobata, Blainville, Dict. Sci. Nat.

Terebratula pectinata, Blainville, l. c.

Terebratella dorsata, Dall, Am. Journ. Conch. vi. p. 116. 1870. (Type of D'Orb.)

Terebratella Sowerbyi, King, Zool. Journ. v. p. 333.

Coast of Chili to Magellan Straits.

5. TEREBRATELLA FRONTALIS, Middendorf.

Terebratula frontalis, Midd. Malac. Ross. iii. p. 2. Sib. Reise, Bd. 2, p. 241, pl. 18, fig. 9–14.

Terebratella frontalis, Dall, Am. Journ. Conch. vi. p. 123. 1870.

South Coast of the Ochotsk Sea.

6. TEREBRATELLA MARIÆ, A. Adams.

T. mariæ, A. Adams, An. Mag. N. H. p. 412. 1860. Dav. P. Z. S. p. 305, pl. xxx. f. 16–17. 1871.

Japan.

7. TEREBRATELLA OCCIDENTALIS, Dall.

T. occidentalis, Dall, Proc. Cal. Acad. Sci. iv. p. 182. 1871.

Waldheimia Grayi, of Cala. authors, not of Davidson.

Coast of California, near Monterey.

8. TEREBRATELLA PULVINATA, Gould.

Terebratula pulvinata, Gld. Proc. B. S. N. H. Dec. 1850. Exp. Shells, p. 468, pl. 44, fig. 581.

Waldheimia pulvinata, Gld. Otia. Conch. p. 97. 1862. Cooper, Geogr. Cat. Cal. Moll. p. 3. No. 4. 1867.

Terebratella pulvinata, Cpr. Check List, W. C. Shells, June, 1860. Dall, Am. Journ. Conch. vi. p. 117. 1870.

Terebratula pulvilla, Cpr. Rep. Br. As. p. 213. 1856.

Orange Harbor, Tierra del Fuego.

9. TEREBRATELLA RUBIGINOSA, Dall.

Terebratella ———? Dall, Am. Journ. Conch. vi. p. 122, pl. 6, fig. 4. 1870.

Terebratella rubiginosa, Dall, *loc. cit.* vii. p. 65. 1871.

"*Cape of Good Hope.*" (?)

10. TEREBRATELLA RUBICUNDA, Solander.

Anomia rubicunda, Sol. MSS. Mus. Banks.

Terebratula rubicunda, Donovan, Nat. Rep. pl. 56, fig. 2–4. Sby. Thes. Conch. i. p. 351, pl. 70, figs. 45–47. Dav. An. Nat. Hist. p. 367. 1852.

Terebratella rubicunda, Reeve, Conch. Icon. pl. vii. fig. 27 *a–b*. Dall, Am. Journ. Conch. vi. p. 117. 1870.

Waltonia Valenciennesii, Dav. (fry) teste Woodward.

New Zealand.

11. TEREBRATELLA SPITZBERGENSIS, Davidson.

T. Spitzbergensis, Dav. P. Z. S. p. 78. 1852. Rve. Conch. Icon. pl. vii. fig. 24. Dav. P. Z. S. p. 305, pl. xxx. figs. 13–14. 1871.

T. caput-serpentis, Hisinger (not Linné). 1837.

Magasella Spitzbergensis, Dall, Am. Journ. Conch. vi. p. 137. 1870.

Arctic Seas; both shores of Northern Atlantic; Japan.

12. TEREBRATELLA TRANSVERSA, Sowerby.

Terebratula transversa, Sby. Thes. Conch. i. p. 261, pl. 72, figs. 114–115. 1846. Dall, A. J. C. vii. p. 64.

Terebratula caurina, Gld. Proc. B. S. N. H. iii. 1850. Exped. Shells, p. 468, pl. 44, fig. 582.

Terebratella caurina, Gld. Otia Conch. p. 97. 1862. Cpr. Supl. Rep. Br. As. p. 636. 1864. Dall. Am. Journ. Conch. vi. p. 119, pl. 6, figs. 1–3. 1870.

T. canrena, Cpr. Rep. Br. As. p. 298. 1856.

Aleutian Islands to Oregon, W. C. N. Am.

DOUBTFUL SPECIES.

Terebratella Labradorensis, Sby. Thes. Conch. i. p. 362, pl. 71, figs. 89–90.

Labrador??

Subgenus LAQUEUS, Dall.

Laqueus, Dall, Am. Journ. Conch. vi. p. 123. 1870.

1. LAQUEUS CALIFORNICA, Koch.

Terebratula Californica, Koch, Kuster, Nov. Ed. Mart. viii. pl. 26, figs. 21–23. Sby. Thes. Con. i. p. 352, pl. 70, figs. 50–52.

Waldheimia Californica, Gray, B. M. Cat. p. 60, No. 8. Cpr. Suppl. Rep. Br. As. p. 568 and 636, Cp. Geog. Cat. p. 3.

Laqueus Californicus, Dall, l. c. p. 123, pl. 7, fig. *f*, pl. 8, figs. 9–10. 1870. Davidson, P. Z. S. p. 306. 1871.

Coast of Sta. Barbara Co., California

2. LAQUEUS RUBELLA, Sby.

Terebratula rubella, Sby. Thes. Conch. i. p. 350, pl. 69, figs 40–42. 1846.

Laqueus suffusus, N. S.? Dall, Am. Journ. Conch. vi. p. 125, pl. 7, figs. *g*, *h*, *s*. 1870.

Waldheimia cranium, A. Ad. An. Mag. Nat. Hist. xi. ser. iii. 1863. (Non Müller.)

Terebratella rubella, Gray, B. M. Cat. p. 90.

Laqueus rubella, Davidson, P. Z. S. p. 306, pl. xxx. figs. 18–22. 1871.

Japan.

Genus **MEGERLIA**, King.

Megerlia, King, Perm. Fos. pp. 81, 145. 1850.

Megerlea, Dav. Intr. a l'Hist. Nat. des Brach. Mém. Lin. Soc. de Norm. p. 129. 1856.

Not *Megerlea*, Robineau Desvoidy (Diptera).[1]

Megathyris (pars) D'Orb.

Orthis, Phil. Moll. Sicilia, ii. p. 67. Michelotte, Fauna Mis. pl. ii. fig. 21.

Terebratella (pars), D'Orb. An. Sci. Nat. p. 66. 1848.

Ismenia, King, Perm. Fos. pp. 81, 142 (not p. 245). Gray, B. M. Cat. p. 104.

SECTION A. (*Megerlia.*)[2]

1. MEGERLIA TRUNCATA, Linné.

Anomia truncata, Lin. S. N. 1152. 1767.

[1] Genus not adopted, and hence not pre-occupied.

[2] Lateral loops closed, shell transverse, sculptured.

Terebratula truncata, Retz, Nov. Gen. p. 14. 1788.
Anomia disculus, Pallas. Misc. Zool. p. 184, pl. 14, fig. 1.
Terebratula disculus, Blainv. Dict. Sci. Nat. liii. p. 138.
Terebratella truncata, D'Orb. An. Sci. Nat. viii. p. 66, pl. vii. figs. 11, 12, 16, 37. 1848.
Orthis truncata, Phil. Moll. Sic. ii. p. 69.
Terebratula oblita, Michel. Brach. p. 4.
Orthis oblita, Michel. Faun. Misc. pl. ii. f. 21.
Megathyris oblita, D'Orb. Prodr. iii. p. 134.
Anomia scobinata, Gmel. Syst. Nat.
Terebratula decussata, De Blainv.
Terebratula irregularis, De Blainv.
Megerlia truncata, King, Perm. Fos. p. 145. Rve. Conch. Icon. pl. xi. fig. 47 *a–c*.

Mediterranean; adjacent Atlantic shores; Australia.

DOUBTFUL SPECIES.

(?) *Megerlia* (*Terebratula*) *Monstriüosa*, Scacchi, Oss. Zool. ii. p. 1. *Mediterranean.*

SECTION B. (*Ismenia.*)[1]

2. MEGERLIA JEFFREYSI, Dall.

Ismenia? Jeffreysi, Dall, Am. Journ. Conch. vii. p. 65, pl. xi. fig. 7–10, Mar. 1871.

Northeast Atlantic.

3. MEGERLIA SANGUINEA, Chemn.

Anomia sanguinea, Chemn. Conch. Cab. viii. p. 96, pl. 78, fig. 706. Dillwyn, Cat. Rec. Shells, p. 293. 1817 (not of Solander).
Anomia sanguinolenta, Gmel. S. N. p. 3347.
Anomia cruenta, Sol. MSS. (not of Dillwyn).
Terebratula cruenta, Donov. Nat. Rep. pl. 56, f. 1.
Terebratula erythroleuca, Quoy & Gaim. Voy. Astrolabe. iii. p. 557, pl. 85, figs. 8–9. Desh. in Lam. Ed. ii. vii. p. 350.
Terebratula sanguinea, Sby. Thes. Conch. i. p. 357, pl. 71, figs. 71–73 (not of Lam., Leach, nor Donovan).
Terebratula pulchella, Sby. Thes. Conch. i. p. 360, pl. 71, figs. 105–107.

[1] Lateral loops open, shell more or less swollen, ovate, smooth.

Terebratella sanguinea, Dav. An. Nat. Hist. p. 368. 1852. Gray, B. M. Cat. p. 90. Reeve, Conch. Icon. pl. vii. fig. 25, *a*, *b*, *c*.

Megerlea pulchella, Dav. An. Nat. Hist. p. 369. 1852.

Ismenia pulchella, Gray, B. M. Cat. p. 104.

Ismenia sanguinea, A. Ad. An. Nat. Hist. ii. p. 99. 1863.

Megerlia sanguinea, Dav. P. Z. S. p. 308, pl. xxxi. fig. 1–2. 1871.

Japan; Indo-Pacific.

DOUBTFUL SPECIES.

Megerlia (*Ismenia*) *Reevei*, A. Ad. An. Mag. N. H. ii. p. 99. 1862. Dav. P. Z. S. p. 308, pl. xxxi. fig. 3 (? *sanguinea*, var.). 1871. *Gotto, Japan.*

Genus **MAGASELLA**, Dall.

Magasella, Dall, Am. Journ. Conch. vi. p. 134. 1870. Dav. P. Z. S. p. 307. 1871.

1. MAGASELLA ADAMSI, Davidson.

M. Adamsi, Dav. P. Z. S. p. 307, pl. xxx. figs. 23, 24. 1871.

Japan.

2. MAGASELLA ALEUTICA, Dall.

M. Aleutica, Dall, Proc. Cal. Acad. Sci. Dec. 16, 1872 (published in advance of Proc.).

Unalashka to the Shumagins.

3. MAGASELLA CRENULATA, Sowerby.

Terebratula crenulata, Sby. Thes. Conch. i. p. 358, pl. 71, figs. 96–98. 1846.

Magas crenulata, Gray, B. M. Cat. p. 99.

Magasella crenulata, Dall, l. c. p. 137.

"*Santa Cruz, Canaries.*" (?)

4. MAGASELLA CUMINGI, Davidson.

T. Cumingi, Dav. P. Z. S. p. 78, pl. xiv. figs. 10–16. 1852. Rve. Conch. Ic. pl. viii. f. 29.

Magasella Cumingi, Dall, l. c. p. 137. 1870.

New Zealand.

5. MAGASELLA EVANSII, Davidson.

Terebratella Evansii, Dav. P. Z. S. p. 77, pl. xiv. fig. 7–9. 1852.

Magas Evansii, Gray, B. M. Cat. p. 99.

Magas Valenciennesii, Rve. Conch. Ic. pl. 8, fig. 31 *a*, *b*, *c*.
Magasella Evansii, Dall, l. c. p. 134, fig. 16 *a*, *b*. 1870. (Type.) *New Zealand.*

6. MAGASELLA FLEXUOSA, King.
Terebratula flexuosa, King, Zool. Journ. v. p. 337. Sby. Thes. Conch. i. p. 347, pl. 69, figs. 23, 24. 1846.
Terebratella flexuosa, Gray, B. M. Cat. p. 87.
Terebratella magellanica, Reeve, Conch. Icon. Journ. de Conchyl, p. 127. 1861.
Magasella flexuosa, Dall, l. c. p. 135.
Orange Harbor, Patagonia.

7. MAGASELLA GOULDII, Dall.
M. Gouldii, Dall, Dav. P. Z. S. p. 307, pl. xxxi. fig. 11 *a*, *b*, *c*. 1871.
M. Gouldii, Dall, Am. Journ. Conch. vii. p. 67, pl. 11, fig. 11. July, 1871. *Japan.*

8. MAGASELLA INCONSPICUA, Sowerby.
Terebratula inconspicua, Sby. Thes. Conch. i. p. 359, pl. lxxi. figs. 102–104. 1846.
Terebratella rubicunda, Reeve non Sol.
Magasella inconspicua, Dall, Am. Journ. Conch. vii. p. 67. 1871.
Lyall Bay, New Zealand.

9. MAGASELLA LÆVIS, Dall.
M. lævis, Dall, Am. Journ. Conch. vi. p. 136, pl. vi. figs. 9, 10, 13. 1870.
Orange Harbor, Patagonia.

10. MAGASELLA PATAGONICA, Gould.
Terebratula Patagonica, Gld. Proc. B. S. N. H. Dec. 1850. Otia Conch. p. 97. Exp. Shells, pl. 44, figs. 583, 583 *e*.
Waldheimia patagonica, Gld. Otia Conch. Rect. p. 246, Index, p. 256.
Terebratulina? patagonica, Suess, Wohn. der Brach. ii. p. 16.
? Magas patagonica, Dall, l. c. p. 133, pl. 6, figs. 11, 12. 1870.
Orange Harbor, Patagonia.

11. MAGASELLA SUFFUSA, Reeve.
Terebratella suffusa, Rve. Conch. Icon. pl. v. fig. 18, Journ. Conchyl. p. 128. 1861.
Magasella suffusa, Dav. P. Z. S. p. 307. 1871. Dall, l. c. vii. p. 67. 1871.
Habitat?

SECTION KRAUSSININÆ, DALL.

Kraussininæ, Dall, l. c. p. 137. 1870.

Genus KRAUSSINA, DAV.

Kraussia, Dav. An. Nat. Hist. ix. p. 369. 1852. Gray, B. M. Cat. p. 109. Rve. Conch. Ic. pl. ix. (nom. preoc. in corals, teste Davidson).

Kraussina, Dav. An. Mag. Nat. Hist. p. 39. 1861. Dall, Am. Journ. Conch. vi. p. 138. 1870.

1. KRAUSSINA COGNATA, Chemn.

Anomia cognata, Chemn. Con. Cab. viii. p. 78, pl. 688.

Terebratula cognata, Sby. Thes. i. p. 346, pl. 68, figs. 12–14.

Kraussia cognata, Dav. An. Nat. Hist. p. 370. 1852. Reeve, Conch. Icon. pl. ix. fig. 38.

Kraussina cognata, Dall, Am. Journ. Conch. vi. p. 140. 1870.

South Africa.

2. KRAUSSINA LAMARCKIANA, Dav.

Kraussia Lamarckiana, Dav. P. Z. S. p. 80, pl. xiv. figs. 22, 23. 1852. Gray, B. M. Cat. p. 111.

Kraussina Lamarckiana, Dav. An. Mag. Nat. Hist. p. 39. 1861. Dall, l. c. p. 139, fig. 18. 1870.

Sidney, Australia.

3. KRAUSSINA PICTA, Val.

K. picta, Val. Verh. Zool. Bot. Ges. Wien, p. 894. 1865. Dall, l. c. vi. p. 140. 1870.

Island of St. Paul, Indian Ocean.

4. KRAUSSINA RUBRA, Pallas.

Anomia rubra, Pallas, Misc. Zool. pl. xiv. figs. 2, 11. 1766.

Anomia striata, Chemn. viii. p. 94, pl. 77, f. 703.

Anomia capensis, Gmelin, Syst. Nat. p. 3347. Dillwyn, Cat. R. S. i. p. 292.

Terebratula rubra, Blainv. Dict. Sci. Nat. liii. p. 138. Sby. Thes. Conch. i. pl. 68, fig. 10.

Terebratula capensis, Krauss. Sud-Afr. Moll. p. 32, pl. ii. fig. 10 (not of Ad. & Rve.)

Terebratula rotundata, Blainv. fide Rve.

Kraussia rubra, Dav. An. Mag. N. H. p. 370. 1852 (Type). Rve. Conch. Icon. pl. ix. fig. 37 *a*, *b*, *c*. Gray, B. M. Cat. p. 109.

Kraussina rubra, Dav. An. Mag. N. H. p. 39. 1861 (Type). Dall, l. c. p. 138, f. 17.

South Africa.

DOUBTFUL SPECIES.

KRAUSSINA PISUM, Lam. (Val.) An. s. Vert. Ed. ii. vii. p. 330.
T. algoensis, Sby.
Terebratula natalensis, Krauss. = *K. cognata*?

South Africa.

KRAUSSINA CAPENSIS, Ad. & Rve. Zool. Samar. p. 71, pl. 21, f. 4. = *Kraussia Deshayesii*, Dav. = *K. rubra*, Pallas?

South Africa.

Genus **BOUCHARDIA**, Dav.

Bouchardia, Dav. Bull. Soc. Geol. de France, vii. p. 62, pl. i. 1846. Rve. Conch. Icon. pl. viii.

Pachyrhynchus, King, Perm. Fos. p. 70. 1850.

1. BOUCHARDIA ROSEA, Mawe.
Terebratula tulipa, Blainv. Dict. Sci. Nat. liii. p. 144. 1824.
T. unguis, Kuster, Conchyl. Cab. vii. p. 35, figs. 8–10.
Anomia rosea, Mawe, Int. to Conch. t. 15, fig. 4. 1823. (*Terebratula rosea*, Sby. Gen. fig. 4. Thes. Conch. i. p. 357, pl. lxxi. figs. 74–77. Hanley, Rec. Sh. p. 322. 1856.
Bouchardia rosea, Dav. l. c. pl. i. figs. 1–6. (Type.)
Pachyrhynchus roseus, King, Perm. Fos. p. 70.
Bouchardia tulipa, Dav. Mt. Brach. p. 70, figs. 17–18, pl. vi. figs. 22–25. Rve. Conch. Icon. pl. viii. f. 33. Dall, l. c. p. 141.

Rio de Janeiro.

DOUBTFUL SPECIES.

BOUCHARDIA FIBULA, Rve. Conch. Ic. pl. vii. fig. 30 *a–b*. 1861. = *B. tulipa* var.?

Habitat?

SECTION **PLATIDIINÆ**, DALL.

Platidiinæ, Dall. Am. Journ. Conch. vi. p. 142. 1870.

Genus **PLATIDIA**, Costa.

Platidia, O. G. Costa, Fauno del Reg. Nap. p. 47. Jan. 1852. Dall, Am. Journ. Conch. vi. p. 142, 1870, vii. p. 68. 1871.

Morrisia, Davidson, An. Nat. Hist. p. 371. May, 1852. Also Woodward, Bronn, Reeve, H. & A. Adams and Chemn.

1. PLATIDIA ANOMIOIDES, Scacchi.

Orthis anomioides, Scacchi, Phil. Moll. Sic. ii. p. 69, pl. 18, fig. 9. 1844.

T. appressa, Forbes, Rep. Br. As. p. 193. 1843.

T. seminulum, Davidson (not Phil.).

Morrisia anomioides, Dav. Mt. Brach. and An. Nat. Hist. p. 371. 1852. Rve. Conch. Icon. pl. 10, fig. 40.

Platidia anomoides, O. G. Costa, l. c. p. 47. 1852. Dall, l. c. p. 143, figs. 20–21. Bull, M. C. Zool. iii. No. 1, p. 18. 1871.

Florida Reefs; Shetland Islands; Mediterranean.

2. PLATIDIA GIGANTEA, Deshayes.

P. gigantea, Desh. Maillard, Moll. Isle de Bourbon. 1864.

Isle de Bourbon, Southern Ocean.

3. PLATIDIA LUNIFERA, Philippi.

T. lunifera, Phil. Moll. Sicilia, i. p. 97, pl. vi. fig. 16. 1836.

Orthis lunifera, Phil. loc. cit. ii. p. 69. 1844.

Morrisia lunifera, Gray, B. M. Cat. p. 108.

Platidia lunifera, Dall, l. c. p. 143. 1870.

Mediterranean.

DOUBTFUL SPECIES.

PLATIDIA DAVIDSONI, Deslongchamps, An. Nat. Hist. xvi. p. 443, pl. x. fig. 20 *a–d*. 1855.

Mediterranean.

SECTION **MEGATHYRINÆ**, DALL.

Argiopidæ, King, Perm. Fos. p. 142. 1850.

Megathyrinæ, Dall, l. c. p. 143. 1870. Bull. Mus. C. Zool. iii. i. p. 18. 1871.

Genus **MEGATHYRIS**, D'Orbigny.

Megathyris, D'Orb. Pal. Fran. Terr. Cret. p. 147. 1847. Prodr. ii. p. 259, An. Sci. Nat. 1848. Forbes & Hanley, Brit. Moll. ii. p. 361. 1850. Dall. Am. Journ. Conch. vi. p. 144, 1870; vii. p. 68. Bull. Mus. Comp. Zool. iii. i. p. 18. 1871.

Argiope, Deslongchamps, Mém. Soc. Lin. de Norm. vii. p. 9, 1842 (not Savigny & Audouin, 1827, *Arachnidæ*). Desl. Bull. Soc. Geol. de France, vii. ser. ii. p. 65. Also Davidson, Reeve, Woodward, Bronn, H. & A. Adams, Chemn, Jeffreys, and the majority of authors. (Nom. preoc.)

Orthis, sp. Phil. Hagen, Michellotti, non Dalman.

1. MEGATHYRIS DECOLLATA, Chemnitz.

Anomia decollata, Chemn. Conch. Cab. viii. p. 96, pl. 78, fig. 705.

Anomia detruncata, Gmelin, Syst. Nat.

Terebratula ungula, Retz, Nov. Gen. Test. 1788.

Terebratula decollata, Deshayes, An. s. Vert. Ed. ii. vii. p. 350.

Terebratula aperta, Blainville, Dict. Sci. Nat. Also Hidalgo, teste Jeffreys.

Terebratula pectiniformis, Costa, Fauna del Reg. Nap. 1852.

Terebratula dimidiata, Scacchi.

Terebratula cardita, Risso, Faun. Eur. Mer.

Terebratula aura-antiqua, Risso, l. c.

Argiope decollata, Desl. l. c. (type.) Dav. Rve. Conch. Icon. pl. x. and most modern authors.

Megathyris decollata, D'Orb. l. c. (type.) Dall, Am. Journ. Conch. vi. p. 145, figs. 22, 23, 1870; vii. p. 68, 1871.

Atlantic coast of Spain, Mediterranean.

Subgenus CISTELLA, Gray.

Cistella, Gray, B. M. Cat. p. 114. Jan. 1853. H. & A. Adams, Gen. Rec. Moll. ii. p. 581. Dall, l. c. vi. p. 145, vii. p. 68. Bull. Mus. Comp. Zool. l. c. p. 19.

Zellania, Moore, Proc. Somerset Arch. Nat. Hist. Soc. 1854. Davidson, Mem. Soc. Lin. de Norm. p. 141. 1856 (type *Z. Davidsoni*, Moore). Chem. Man. de Conchyl. ii. p. 210.

1. CISTELLA BARRETTIANA, Davidson.

Argiope Barrettiana, Dav. P. Z. S. p. 103, pl. xii. fig. 3 *a–c*. Feb. 1866.

Argiope antillarum, Crosse & Fischer, Journ. de Conchyl. p. 270, pl. viii. fig. 7. Mar. 1866.

Cistella Barrettiana, Dall, l. c. vi. p. 146.

Jamaica; Guadaloupe.

1*a*. CISTELLA BARRETTIANA, var. LUTEA, Dall.

C. Barrettiana, var. *lutea*, Dall, Bull. Mus. Comp. Zool. iii. No. 1, p. 20, pl. i. fig. 5, 5*a*, pl. ii. figs. 4–8. May, 1871.

Tortugas.

2. CISTELLA CISTELLULA, S. Wood.

Terebratula cistellula, S. Wood. An. Mag. N. Hist. vi. p. 5. 1840.

Ter. lunifera, Phil. Moll. Sic. ii. 1844 (not of Sowerby).

Megathyris cistellula, Fbs. & Hanl. Brit. Moll. ii. p. 361, pl. 57, fig. 9. 1850.

Argiope cistellula, Davidson, An. Mag. Nat. Hist. p. 40. 1861. Rve. Conch. Icon. pl. 10, fig. 46.

Cistella cistellula, Gray, B. M. Cat. p. 114. 1853. Dall, l. c. vi. p. 146. 1870.

Northwest shores of Europe; Zetland; Mediterranean.

3. CISTELLA CUNEATA, Risso.

Terebratula cuneata, Risso, Eur. Merid. p. 388, fig. 179. 1826.

T. detruncata, Scacchi, non Gmelin.

T. soldaniana, Risso, l. c. p. 389, fig. 178. Also Blainville.

T. pera, Kuster, vii. i. t. 2, 6, figs. 14–18, as of Muhlf.

Orthis pera, Phil. Moll. Sic. ii. 1844.

Argiope cuneata, Dav. An. Mag. Nat. Hist. p. 40. 1861. Rve. Conch. Icon. pl. 10, fig. 44.

Cistella cuneata, Gray, B. M. Cat. p. 114 (type).

Mediterranean.

4. CISTELLA NEAPOLITANA, Scacchi.

Ter. Neapolitana, Scacchi, Oss. Zool. ii. p. 18. 1833.

Orthis Neapolitana, Phil. ii. p. 69.

Argiope Neapolitana, Dav. An. Mag. Nat. Hist. p. 40. 1861.

Ter. seminulum, Phil. i. p. 97, non Davidson.

Ter. lunifera, Sby. i. p. 356, t. 71, figs. 85–86, non Philippi.

Argiope Forbesii, Davidson.

Cistella Neapolitana, Dall, l. c. vi. p. 146, fig. 24. 1870.

Mediterranean.

5. CISTELLA SCHRAMMI, Crosse & Fischer.

Argiope Schrammi, Crosse & Fischer, Journ. de Conchyl. xiv. p. 269, pl. viii. fig. 6. Mar. 1866.

Cistella Schrammi, Dall, l. c. vi. p. 146. 1870. Bull. Mus. Comp. Zool. iii. No. 1, p. 19. 1871.

Guadaloupe, W. I.

5*a*. CISTELLA (SCHRAMMI, var.?) RUBROTINCTA, Dall.

Cistella (Schrammi, var.?) rubrotincta, Dall, Bull. Mus.

Comp. Zool. l. c. p. 19, pl. i. fig. 6,-6*a*. May, 1871. Am. Journ. Conch. vii. p. 68. July, 1871.

Tortugas.

6. CISTELLA WOODWARDIANA, Davidson.

Argiope Woodwardiana, Dav. P. Z. S. p. 103. Feb. 1866. pl. xii. fig. 4 *a–c*.

Cistella Woodwardiana, Dall, Am. Journ. Conch. vi. p. 146, vii. p. 69. Bull, M. C. Z. l. c. p. 42.

Jamaica.

Family THECIDIIDÆ, Dall.

Thecidæ, Desh. Ency. Meth. iii. 1836.

? *Thecidiidæ*, Dall, Am. Journ. Conch. vi. p. 147. 1870.

Genus THECIDIUM, Defrance.

Thecidea, Defr. Férussac, Tabl. Syst. p. 38. 1828.

Thecidium, Lacaze Duthiers, Ann. Sci. Nat. Zool. t. xv. p. 262. 1861.

Thecidium, Sby. Gen. Shells, xx. 1844. Dav. Intr. Brit. Brach. p. 77. Dall, Am. Journ. Conch. vi. p. 147.

1. THECIDIUM BARRETTI, Woodward.

T. Barretti, Woodv. Geol. Mag. i. pl. ii. f. 1–3. 1864. Dav. P. Z. S. p. 104. 1866. Dall, l. c. p. 151.

Jamaica.

2. THECIDIUM MEDITERRANEUM, Risso.

Thecidea Mediterranea, Risso, Eur. Mer. p. 394, fig. 183. Desh. Lam. vii. p. 346, Phil. Moll. Sic. i. p. 99, t. 6, fig. 17.

T. Mediterraneum, Sby. Thes. Conch. vii. p. 371, pl. 73, figs. 30–32. 1846. Lacaze Duthiers, l. c. p. 262, pl. i.–iv. Dall, l. c. p. 151, fig. 27.

T. testudinaria, Michelotti.

T. spondylea, Scacchi. *Jamaica? Mediterranean.*

Family RHYNCHONELLIDÆ, Gray.

Rhynchonellidæ, Gray, B. M. Cat. 1850. Dav. Intr. Brit. Brach. p. 73. 1851. Dall, l. c. vii. p. 69. 1871.

Genus RHYNCHONELLA, Fischer.

Rhynchonella, Fischer de Waldheim, Not. Fos. du Gour. de Moscou. 1809. (Type *R. loxia*, F., Jura.)

Stenocisma? James Hall.

Subgenus HEMITHYRIS, D'Orb.

Hemithiris, D'Orb. Pal. Fran. Fer. Crèt. vol. iv. p. 342. 1847. Dall, Am. Journ. Conch. vii. p. 70. 1871.

Hypothyris, sp. Fbs. and Hanley, Brit. Moll. ii. p. 345. 1855.

1. HEMITHYRIS GRAYI, Woodward.

Rhynchonella Grayi, Woodw. An. Mag. N. Hist. p. 444, pl. x. fig. 16 *a–b–c*, 1855. Dall, l. c. vi. p. 153. 1870.

Feejee Islands.

2. HEMITHYRIS LUCIDA, Gld.

Rhynchonella lucida, Gld. Proc. B. S. N. H. p. 323. 1860. Otia Conch. p. 121. A. Ad. An. Mag. N. H. 3d ser. xi. p. 100. 1863. Dall, l. c. vi. p. 153. 1870. Dav. P. Z. S. p. 309. pl. xxxi. figs. 13, 14. 1871.

Japan.

3. HEMITHYRIS NIGRICANS, Sby.

Rhynchonella nigricans, Sby. (as *Terebratula*), Thes. Conch. i. p. 342, pl. 71, figs. 81–82. 1846. Dall, l. c. p. 152, fig. 34. 1870.

New Zealand.

4. HEMITHYRIS PSITTACEA, Gmelin.

Anomia psittacea, Gmelin, S. Nat. 3348.

Rhynchonella psittacea, Auct. Rve. Conch. Icon. pl. i. f. 2 *a–c* Dall, l. c. vi. p. 152, fig. 30–33. 1870.

Hemithiris psittacea, D'Orb. l. c. (type).

Hypothyris psittacea, Fbs. and Hanl. Br. Moll. ii. p. 346, t. 57, f. 1–3.

Boreal and Arctic Seas.

5. HEMITHYRIS SICULA, Sequenza.

Rhynchonella sicula, Sequenza, Dav. Mon. It. Tert. Brach. ii. p. 23, pl. xx. fig. 6. 1870. Dall, l. c. vii. p. 70. 1871.

Coast of Portugal.

6. HEMITHYRIS WOODWARDI, A. Adams.

Rhynchonella Woodwardi, A. Ad. An. Mag. 3d ser. xi. p. 100. 1863. Dav. P. Z. S. p. 309, pl. xxxi. fig. 12. 1871. Dall, l. c. vi. p. 153. 1870.

Japan.

Genus **DIMERELLA**, Zittel.

Dimerella, Zittel, Dunker and Von Meyer's, Pal. Aug. p. 220. 1870. Type *D. Gumbeli*, Zit. l. c. p. 222, pl. xli. figs. 27–30.

Cryptopora, Jeffreys, Nature, p. 136. Dec. 2, 1869. (No descr.)

Atretia, Jeffreys, Proc. Roy. Soc. 121, p. 421, par. 36. (No description.)

1. DIMERELLA GNOMON, Jeffreys, MSS.

(Jeffreys, l. c. ad ref. descr. null. *Cryptopora gnomon et Atretia gnomon.*) Dall, l. c. vii. p. 70. 1871.

Deep Sea, west of Ireland.

ORDER **LYOPOMATA**, OWEN.

Lyopomata, Owen, Enc. Brit. Ed. viii. vol. xv. Article Mollusca, p. 339. 1858. Dall, Bull. Mus. Comp. Zool. iii. No. 1, p. 25. 1871.

Pleuropygia, Bronn, Thierr. iii. 1st Abth. p. 301. 1862.

Inarticulata, Huxley, Lect. Class. 1864. Intr. Class. An. p. 116. 1869.

Brachiopoda, valves libres, Desh. Lamk. An. s. Vert. 2d Ed. vii. p. 309. 1836.

Palliobranchiata, testa acardis, Van der Hœven, Handb. der Zool. p. 692. 1850.

Family CRANIIDÆ, Gray.

Craniadæ, Gray, B. M. Cat. p. 155. 1840. Dav. Int. Class. Brit. Brach. p. 51. 1851. Woodward, Man. Rec. and Foss. Shells, p. 235. 1854.

Cranidæ, Owen, Anat. Inv. Index, p. 683. 1853.

Craniidæ, H. & A. Ad. Gen. Rec. Moll. ii. p. 583. 1858. Jeffreys, Brit. Conch. ii. p. 24. 1863. Dall, Bull. Mus. Comp. Zool. iii. No. 1, p. 25. 1871. (Full synonymy.)

Genus **CRANIA**, Retzius.

Crania, Retzius, Schrift. Berl. Ges. Naturf. Freunde, Bd. ii. p. 72. 1781. Type *C. craniolaris*, Lin. sp. Syst. Nat. xii. i. pl. ii. p. 1150. 1767. = *C. brattensburgensis*, Retz. + *C. numurulus*, Lam. Dall, Bull. Mus. Comp. Zool. vol. iii. No. 1, p. 27. 1871. (Full synonymy.)

Cranicella, Raf. 1815, + *Orbicula*, Cuv. 1798, + *Orbicula* (pars) Lam. 1799, + *Discina*, Turton (sp.), 1822, + *Anomia* (sp.), Lin. 1760, + *Patella* (sp.), Muller, 1766, + *Siphonaria* (sp.), Quenstedt, 1852, + *Criopus*, Gray,

1821, + *Craniolites*, Schlotheim, 1820, + *Orbicularius*, Dumeril, 1809, + *Numulus*, Agassiz, 1846, + *Criopododerma*, Agassiz, 1848, + *Cryopus*, Deshayes, 1836, etc. etc.

Subgenus CRANIA, Dall.

Crania, Dall, Bull. Mus. Comp. Zool. *loc. cit.* p. 26. 1871.

1. CRANIA ANOMALA, Muller.

Patella anomala, Mull. Prodr. Zool. Dan. p. 237, 2870. 1776. Gmel. S. N. p. 3721.

Patella distorta, Montagu, Trans. Lin. Soc. xi. p. 195, pl. 13, fig. 5. 1808.

Patella Kermes, Humphrey, fide Sby. & Rve.

Anomia turbinata, Dillwyn, Cat. i. p. 286.

Criopus anomalus, Flem. Phil. Zool. ii. p. 499.

Criopus orcadensis, Leach, Gray, Moll. Gt. Brit. p. 358, pl. xiii. figs. 6–8. Dec. 1852.

Orbicula norvegica, Lam. Syst. p. 140. 1801. Not of Sby. Lin. Tr. and Gen. Sh., Rang. Man. nor Blainville, Man. p. 515.

Orbicula anomala, Cuvier, Tabl. El. p. 435. 1799.

Discina ostreoides, Turton, Dith. Brit. p. 238. 1822. Not of Lamarck.

Crania turbinata, Hanley, Wood's Index, Test. pl. xi. fig. 2. 1856. Not of Poli.

Crania personata (part), Defrance, Dict. Sci. Nat. xi. p. 312. 1818.

Crania personata. Lam. (syn. excl.). An. s. Vert. Ed. i. iv. p. 938. 1819.

Crania norvegica, Sby. Thes. Conch. i. p. 368, pl. 73, figs. 15 and 17. 1847. Fbs. and Hanl. Brit. Moll. i. pl. U. fig. 2. 1853.

Crania rostrata, Thorpe, Brit. Mar. Conch. p. 125. 1844. Also Fbs. and Hanley, Brit. Moll. ii. p. 366. 1855. Not of Hœninghaus.

Crania anomala, Sby. Conch. Man. Ed. ii. p. 125, fig. 197*a*. 1842. Dav. Int. Brach. p. 123, figs. 44–46, pl. ix. figs. 237, 238. Rve. Conch. Icon. pl. i. fig. 4. 1862. Dall, Bull. Mus. Comp. Zool. vol. iii. No. 1, p. 33. 1871. (Full synonymy.)

North European Seas.

1*a*. CRANIA ANOMALA, var. TURBINATA, Poli.

Anomia turbinata, Poli, Test. Utriusq. Sicil. ii. p. 189, 261, t. 30, fig. 15. 1795. (In synonymy.)

Criopus fimbriatus, Poli, l. c. (Animal.)

Criopderma turbinatum, Poli, l. c. (Shell.)

Anomia craniolaris (pars), Gmelin, Syst. Nat. p. 3340. 1792.

Orbicula turbinata, Lam. An. s. Vert. Ed. ii. vii. p. 317. 1836.

Crania personata, Blainv. Dict. Sci. Nat. xi. p. 312. Desh. Enc. Meth. ii. c. p. 16. 1830. (Part.)

Crania ringens, Hœninghaus, Mon. Cran. p. 3, No. 2, fig. 2. Lam. Hist. An. s. Vert. Ed. ii. vii. p. 302. 1836. Sby. Thes. Conch. i. p. 367, pl. 73, f. 10, 11.

Crania rostrata, Desh. An. s. Vert. Ed. ii. vii. p. 302. 1836. (Partly.) Not of Hœninghaus.

Crania anomala, var. *turbinata*, Dall, Bull. Mus. Comp. Zool. l. c. p. 34. 1871. (Full synonymy.)

Mediterranean.

1*b*. CRANIA ANOMALA, var. ALBA, Jeffreys.

C. anomala, var. *alba*, Jeffreys, Brit. Conch. v. p. 165. 1869. Dall, Bull. l. c. p. 34. 1871.

Shetland, Hebrides.

1*c*. CRANIA ANOMALA, var. POURTALESII, Dall.

C. anomala, var. *Pourtalesii*, Dall, Bull. Mus. Comp. Zool. l. c. p. 35, pl. i. fig. 7 *a*, *b*. 1871.

Florida Keys.

2. CRANIA JAPONICA, A. Adams.

Crania japonica, A. Ad. An. Mag. N. Hist. 3d ser. xi. p. 100. 1863. Dall, Am. Journ. Conch. vii. p. 73. 1871. Dav. P. Z. S. p. 311, pl. xxx. fig. 6, 6*a*. 1871.

Gotto, Japan.

3. CRANIA ROSTRATA, Hœninghaus.

C. rostrata, Hœn. Mon. Crania, p. 3, No. 3, f. 3. 1828. Reeve, Conch. Icon. pl. i. f. 3. 1862. Dall, l. c. vii. p. 73. 1871.

Mediterranean.

4. CRANIA SUESSI, Reeve.

Crania Suessi, Reeve, Conch. Icon. Mon. Cran. pl. i. fig. 2. 1862. Dall, l. c. vii. p. 73. 1871. Bull. Mus. Comp. Zool. l. c. p. 32. 1871.

Sydney, Australia.

Family DISCINIDÆ, Gray.

Discinidæ, Gray, Syn. B. M. i. p. 155. 1840. Davidson, Intr. Brach. pp. 51, 125. 1853. Dall, Bull. Mus. Comp. Zool. l. c. p. 36. 1871. (Full synonymy.)

Orbiculacea, Anton, Verzeichn, p. 21. 1839.

Orbiculidæ, King, An. Mag. N. H. xviii. p. 28. 1846.

Orbiculina, Agassiz, Nom. p. 757 (pars). 1848.

Craniadæ (pars), Forbes and Hanley, Brit. Moll. ii. p. 364. 1853.

Genus DISCINA, Lam.

Discina, Lam. An. s. Vert. Ed. i. vi. p. 236. 1819.
Cuvier, Règne An. Ed. Voigt, iii. p. 602.

Crania, β. Schumacher, Essai, p. 102. 1817.

Crania (sp.), Gld. Moll. U. S. Ex. Ex. p. 465. 1852.

Orbicula, Sby. Min. Conch. vi. p. 4, pl. 506. 1830. Sby. Thes. Conch. i. p. 365. 1847. Owen, Anat. Inv. p. 503. 1855. Chemn. Man. ii. p. 231.

Orbicula (sp.), Lam. Eichwald.

Discina, Gray, Ann. Phil. xxvi. (new ser. x.) p. 244. 1825. Dav. Int. Clas. Brach. pp. 51, 126. 1853. H. & A. Adams, Gen. Rec. Moll. ii. p. 584. 1858. Dall, Bull. Mus. Comp. Zool. l. c. p. 38. 1871. (Full syn.)

Subgenus DISCINA, (Lam.) Dall.

Discina, Dall, Bull. Mus. Comp. Zool. l. c. p. 39. 1871.

1. DISCINA STRIATA, Schumacher.

Crania β *striata*, Schum. Essai, p. 102, pl. xx. figs. 1 *a–f*. 1817. Not of Defrance.

Crania radiosa, Gld. Moll. U. S. Ex. Ex. p. 465, figs. 480 *a–c*. 1852.

Orbicula striata, Sby. Thes. Conch. i. p. 366, pl. 73, fig. 9. 1847. Forbes and Hanley, Brit. Moll. ii. p. 368. 1853. Dav. An. Mag. Nat. Hist. ix. p. 376. 1852.

Orbicula Evansi, Davidson, P. Z. S. p. 81, No. 12, pl. xiv. figs. 32–34. 1852. An. Mag. Nat. Hist. ix. p. 376. 1852. Suess, Wohns. I. p. 44 (226). 1859.

Orbicula norvegica, Sby. Trans. Lin. Soc. xiii. p. 468, pl. xxvi. fig. 2. 1822. (Syn. excl.) Gen. Sh. fasc. xiii. figs. 3–5. Not *O. norvegica*, Lam.

Orbicula (s. g. *Discina*) *norvegica*, Blainv. Dict. Sci. Nat. xxxii. p 304. 1824. Man. Mal. p. 515, pl. lv. fig. 5. 1825.

Orbicula (s. g. *Discina*) *ostreoides*, Rang, Man. Moll. p. 263. 1829.

Orbicula ostreoides, Reeve, Conch. Icon. No. 7, pl. i. fig. 7 *a–b*. 1862.

Discina ostreoides, Lam. Hist. An. s. Vert. Ed. i. vi. p. 237. 1819. (Type; no descr.) Ed. ii. vii. p. 297. 1836. Thos. Brown. Conch. Textb. Ed. v. p. 108, pl. xiv. fig. 8. 1839. Macgillivray, Ib. Ed. ix. p. 124.

Not *Discina ostreoides*, Turton, Dith. Brit. p. 238. 1822. (= *Crania anomala*.)

Discina striata, Dall, Bull. Mus. Comp. Zool. iii. No. 1, p. 39. 1871. Am. Journ. Conch. vii. p. 75. 1871.

Northwest Coast of Africa.

Subgenus DISCINISCA, Dall.

Discinisca, Dall, Bull. Mus. Comp. Zool. l. c. p. 37. May, 1871. Am. Journ. Conch. vii. p. 74. 1871.

1. DISCINISCA ANTILLARUM, D'Orbigny.

Orbicula antillarum, D'Orb. Moll. Cuba, p. 368, pl. xxviii. figs. 34–36. 1853. Rve. Conch. Icon. pl. i. fig. 2. 1862.

Discinisca? antillarum, Dall, Bull. Mus. Comp. Zool. l. c. p. 42. Am. Journ. Conch. vii. p. 77. 1871.

Cuba, Martinique

2. *Discinisca* (?) *atlantica*, Jeffreys MSS.

Deep Water, N. E. Atlantic.

3. DISCINISCA CUMINGI, Broderip.

Orbicula Cumingi, P. Z. S. p. 124. 1833. Reeve, Conch. Icon. pl. i. fig. 6.

Orbicula strigata, Brod. P. Z. S. 1833.

Discinisca Cumingi, Dall, Bull. l. c. p. 42. Am. Journ. Conch. vii. p. 77. 1871.

Cape St. Lucas to Panama.

4. DISCINISCA LÆVIS, Sby.

Orbicula lævis, Sby. Trans. Lin. Soc. xiii. p. 468, pl. xxvi. f. 1 *a–d*. 1822. Rve. Conch. Icon. pl. i. fig. 4 *a–b*. 1862.

Discinisca lævis, Dall, Bull. l. c. p. 42. Am. Journ. Conch. vii. p. 76. 1871.

Coast of Peru and Chili.

5. DISCINISCA LAMELLOSA, Broderip.

Orbicula lamellosa, Brod. P. Z. S. p. 124. 1833. Rve. Conch. Icon. pl. ii. fig. 3. 1862.

Orbicula tenuis, Reeve, not Sowerby.

Discinisca lamellosa, Dall (type), Bull. l. c. p. 41. Am. Journ. Conch. vii. p. 76. 1871.

Panama to Peru.

6. DISCINISCA STELLA, Gould.

Discina stella, Gould, Proc. B. S. N. H. vii. p. 323. Sept. 1860. Otia Conch. p. 120.

Orbicula stella, Reeve, Conch. Icon. pl. 1, fig. 1. 1862.

Discinisca stella, Dall, Bull. l. c. p. 41. Am. Journ. Conch. vii. p. 76. 1871.

Singapore; Philippines; China Seas.

7. DISCINISCA TENUIS, Sowerby.

Orbicula tenuis, Sby. Thes. Conch. i. p. 366, pl. 73, figs. 4, 5. 1847. Not of Reeve.

Discinisca tenuis, Dall, Bull. l. c. p. 41. Am. Journ. Conch. vii. p. 76. 1871.

Habitat?

Family LINGULIDÆ, King.

Lingulidæ, King, Dav. Int. Clas. Brach. p. 133. Dall, Am. Journ. Conch. vi. p. 153.

SECTION **LINGULINÆ**, DALL.

Lingulinæ, Dall, l. c. p. 153. 1870.

Genus **LINGULA**, Bruguière.

Lingula, Brug. Ency. Meth. tab. 250. 1789. Dav. Int. Clas. Brach. p. 133. Dall, l. c. vi. p. 134. 1870.

Pharetra, Mus. Bolt. Ed. ii. p. 111. 1819.

1. LINGULA ADAMSI, Dall.

Lingula tumidula, A. Ad. (not of Reeve), An. Mag. Nat. Hist. 3d ser. xi. p. 100. 1863. Davidson, P. Z. S. p. 310. pl. xxx. fig. 1. 1871.

Korean Archipelago.

2. LINGULA AFFINIS, Hancock.

L. affinis, Han. Tr. Roy. Soc. p. 851, pl. lxvi. figs. 1–2, 1857. Dall, l. c. vii. p. 77. 1871.

East Indies.

3. LINGULA ANATINA, Lamarck.

L. anatina, Lam. Syst. An. s. Vert. Ed. ii. vii. p. 390. 1836. Blainv. Man. t. 51, f. 3. Sby. Thes. Conch. i. p. 337, figs. 1, 2, 2, 9, 10. Dall, A. J. C. l. c. vi. p. 155, figs. 35–37. 1870. (Generic type.)

Lingula Chemnitzii, Kust. vii. i. pl. i. figs. 7–9, teste Hanley.

Mytilus lingua, Dillwyn, Cat. p. 322. 1817.

? *Lingula Murphiana*, King, Rve. Con. Ic. pl. i. f. 3. 1861.

Philippines and Moluccas.

4. LINGULA EXUSTA, Reeve.

L. exusta, Rve. Conch. Icon. pl. ii. fig. 9. 1861. Dall, l. c. vi. p. 156. 1870.

Moreton Bay, Australia.

5. LINGULA HIANS, SWAINSON.

Lingula hians, Sw. Phil. Mag. 62. Zool. Ill. vol. ii. pl. ii. Sby. Thes. Conch. i. p. 388, pl. 77, fig. 4. Dall, l. c. vi. p. 156.

L. Antonii, Kust. vii. i. pl. i. figs. 7–9.

China Seas; Amboyna.

6. LINGULA HIRUNDO, Reeve.

L. hirundo, Rve. Conch. Icon. pl. ii. fig. 7. 1861. Dall, l. c. vi. p. 156. 1870.

Port Curtis, N. E. Australia

7. LINGULA JASPIDEA, A. Adams.

L. jaspidea, A. Ad. An. Mag. Nat. Hist. 3d ser. xi. p. 101. 1863. Dall, l. c. vi. p. 156. Dav. P. Z. S. p. 310, pl. xxx. fig. 3. 1871.

L. Dumortieri, Jeffreys, P. Z. S. p. 311. 1871. (? Not of Nyst.)

Japan.

8. LINGULA LEPIDULA, A. Adams.

L. lepidula, A. Ad. An. Mag. N. H. xi. p. 101. 1863. Dav. P. Z. S. p. 311, pl. xxx. fig. 4. 1871. Dall, l. c. vi. p. 156. 1870.

Inland Sea, Japan.

9. LINGULA OVALIS, Reeve.

L. ovalis, Rve. P. Z. S. p. 100. 1841. Sby. Thes. Conch. i. p. 393, pl. 67, fig. 8. Dall, l. c. vi. p. 156. 1870.

Sandwich Islands.

10. LINGULA SMARAGDINA, A. ADAMS.

L. smaragdina, A. Ad. An. Mag. Nat. Hist. 3d ser. xi. p. 101. 1863. Dall, l. c. vi. p. 156. 1870. Dav. P. Z. S. p. 310, pl. xxx. fig. 2. 1871.

China Sea, Japan.

11. LINGULA TUMIDULA, Reeve.

Lingula tumidula, Rve. P. Z. S. p. 100. 1841. Conch. Syst. i. pl. 125, f. 4. Sby. Thes. Conch. i. p. 393, pl. 67, f. 7.

Lingula compressa, Rve. P. Z. S. p. 100. 1841.

Moreton Bay, Australia.

Genus **GLOTTIDIA**, Dall.

Glottidia, Dall, Am. Journ. Conch. vi. p. 157, 1870; vii. p. 77, 1871.
Lingula, sp. Auct.

1. GLOTTIDIA ALBIDA, Hinds.

Lingula albida, Hinds, Voy. Sulph. p. 71, pl. 19, fig. 4. 1844. Sby. Thes. Conch. i. p. 393, pl. 67, fig. 6. Rve. Conch. Ic. pl. i. fig. 4. 1861.

Glottidia albida, Dall, Am. Journ. Conch. vi. p. 157, pl. 8, fig. 1–6. 1870.

Monterey to San Diego, California.

2. ? GLOTTIDIA ANTILLARUM, Reeve.

Lingula antillarum, Rve. Conch. Icon. pl. ii. fig. 8. 1861.

? *Glottidia antillarum*, Dall, l. c. vi. p. 159.

Martinique, W. I.

3. ? GLOTTIDIA AUDEBARTI, Broderip.

Lingula audebardi, Brod. P. Z. S. p. 125. 1833. Sby. Thes. Conch. i. p. 392, pl. 67, fig. 5.

Lingula audebarti, Rve. Conch. Icon. pl. i. fig. 5.

? *Glottidia audebarti*, Dall, l. c. p. 159.

Bay of Guayaquil.

4. GLOTTIDIA PALMERI, Dall.

Glottidia (*albida* var.?) *Palmeri*, Dall, Am. Journ. Conch. vii. p. 77. 1871.

Head of the Gulf of California.

5. GLOTTIDIA PYRAMIDATA, Stimpson.

Lingula pyramidata, Stimps. Am. Journ. Sci. and Arts, xxxix. p. 444. 1860. Morse, Am. Nat. iv. p. 314, figs. 76–78. 1870.

Glottidia pyramidata, Dall, Am. Journ. Conch. vi. p. 158. 1870.

North and South Carolina.

6. ? GLOTTIDIA SEMEN, Broderip.

Lingula semen, Brod. P. Z. S. p. 125. 1833. Sby. Thes. Conch. i. p. 392, pl. 67, fig. 11.

? *Glottidia semen*, Dall, l. c. vi. p. 159. 1870.

Isle of La Platta, W. Columbia.

MARCH 4.

Mr. VAUX, Vice-President, in the chair.

Twenty-six members present.

Mr. THOMAS MEEHAN exhibited a flower of Bletia Tankervillia (*Phaius grandiflora* of some authors), in which the dorsal sepal (or, as some authors contend, petal), had united with the column, and had been much retarded in its development accordingly. He said that he had several dozen of flowers produced in this way this winter, all however confined to separate spikes from those which bore the perfect flowers. In some cases flowers were produced which had two of the exterior petals united together perfectly, in which case they formed a hood over the apex of the column. As changes of a similar character were not uncommon in Orchidaceous plants, it was likely this form of changed structure had been seen before, though not falling within his own observation. It was usual to pass over these appearances as "monstrosities," but in truth the whole Orchid structure was little less than a monstrosity. If we except the character of the position of the seeds in the capsule, there was little to divide an Orchid from an Iris, beyond the power of combining organs which are free in the Iris—the power which produced the "monstrosity" we see. The stamens were entirely coherent with the pistil in Orchidaceous plants, and free in the Iridaceous. He had seen in a "monstrous" Habenaria the lip so transformed, that the whole flower had as regular an appearance as a *Sisyrinchium* in the Iridaceæ.

He did not think as much had been made out of the changes of structure in Orchids in the study of evolution, as might be, in consequence of the impression that these abnormal forms, as they were termed, were monstrosities, or the results of cultivation. There had been already on record accounts of changes in wild Orchids more remarkable than many much dwelt on by many modern writers on development. Sir Richard Schomburg described and figured forty years ago, in the Linnæan Transactions (15th vol.), three distinct genera—Catasetum, Machranthus, and Myanthus—all growing out of one plant in Demerara; and seed which he took from one of these, and scattered on a piece of rotten wood, produced plants with flowers of one of the other genera. All these facts showed that the power of cohesion of one organ with another was one of the leading forces at work in forming the Orchidaceous structure; and, as we saw in the specimen exhibited to-night, this power could be readily obstructed, so as to produce many variations, it could hardly be said that genera were founded on any absolute law.

He further remarked, that, in examining closely the flowers of Bletia Tankervillia early in the morning, he found on the outside, at the base of the three exterior petals, a liquid exudation from a small gland. It was highly probable that these glands were rudimentary spurs, and that, if the course of nutrition which sustained the cohering power of an Orchid could in any way be diverted before the final direction of form, each of these outer petals might take on some of the labellate character with its attendant spur, which gave such a peculiar appearance to so many Orchidaceous plants.

The death of Dr. Thos. McEuen was announced.

MARCH 11.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-three members present.

The following papers were presented for publication:—

Descriptions of new species of marine shells inhabiting the South Sea Islands. By Andrew Garrett.

Descriptions of a new species of Goniodoris. By Andrew Garrett.

Descriptions of new species of land shells inhabiting the South Sea Islands. By Andrew Garrett.

Mr. THOS. MEEHAN announced the death of Dr. John Torrey, and offered the following resolutions, which were unanimously adopted:—

Resolved, That the Academy of Natural Sciences of Philadelphia receives with profound regret the announcement of the death of Dr. John Torrey, who for fifty years has been one of its most esteemed correspondents, and whose scientific eminence is world renowned.

Resolved, That, as an expression of our sense of the severe loss science suffers by his death, these resolutions be entered on the minutes, and published in the Proceedings of the Academy.

MARCH 18.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-six members present.

The following paper was presented for publication:—
Description of a new variety of Buteo. By Bernard A. Hoopes

Remarks on the Occurrence of an Extinct Hog in America.—Prof. LEIDY exhibited the fragment of a lower jaw of a pig which Prof. Hayden had picked up, together with many remains of extinct mammals, in the pliocene sands of the Niobrara River, Nebraska. The specimen contains the temporary molars, and does not differ anatomically from the corresponding part of the domestic pig. It is heavier than usual, and appears to have undergone some alteration, perhaps by the partial replacement of a portion of its bone cartilage by mineral matter. The specimen he viewed as of recent character, and not as a true indigenous fossil. Prof. L. remarked that he had never seen any remains of the hog which he could confidently view as true American fossils. Rafinesque, DeBlainville, Holmes, and Emmons had reported and represented specimens as American fossils, but he doubted their character as such. He had seen the specimens of Emmons, reputed to be from the miocene of N. Carolina, and those of Holmes, from the shores of the Ashley River, S. C., and felt convinced they were of recent date. Prof. Cope has recently reported the discovery of the tooth of a hog in New Jersey, which he has referred to an extinct species with the name of *Sus vagrans*. He had not seen the specimen, but was inclined to suspect it would turn out to belong to the same category as the former ones.

Prof. COPE mentioned that Prof. W. C. Kerr, State Geologist of North Carolina, had submitted to his examination an entire cranium with other bones of a hog said to have been taken from the Miocene marl of Wilson County, North Carolina, at a depth of ten feet from its surface, or sixteen feet from the surface of the ground. The skull was partially, at least, filled with this matrix. The bone was not silicified, and though there were but two premaxillary teeth, and the canines were small, he thought that it belonged to a sow *Sus scropha*.

Prof. COPE further stated that Dr. Hayden handed to him for determination some bones on a fragment of the Green River shale of the Eocene of Wyoming. They indicated a species of Anourous Batrachian, but, as the individuals were not fully developed, he was not prepared to identify the genus. They constituted the

first indication of this order in time; those previously known from Europe and India being all of Miocene age.

MARCH 25.

Mr. VAUX, Vice-President, in the chair.

Seventeen members present.

There not being a quorum present for the transaction of business, on motion, the meeting adjourned until April 1, when Nathaniel E. Janney, Richard Peterson, Lewis Haehnlen, Peter C. Erben, and Mrs. Levi Morris were elected members: and,

Dr. J. Dalton Hooker, of Kew, England, and Andrew Garrett, of Huaheine, Society Islands, were elected correspondents.

On report of the committees, the following papers were ordered to be printed:—

DESCRIPTIONS OF NEW SPECIES OF MARINE SHELLS INHABITING THE SOUTH SEA ISLANDS.

BY ANDREW GARRETT.

RISSOINA SUPRACOSTATA, Garr., pl. 2, fig. 1.

Shell elongate-oblong, sub-cylindrical, thin, sub-pellucid, white or corneous; spire turreted, long, acute; embryonal whorls 3, smooth; normal whorls 7, convex, upper ones swollen above, the first four with small longitudinal slightly oblique ribs; whole surface with regular crowded delicate raised striæ; suture deeply impressed; aperture oblique, rather large, subovate, about one-third the length of the shell; peristome somewhat dilated, margined by an external flat varix which curves upward over the umbilical region; columella and parietal region covered with a thin callus.

Length 10 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A rare species of which we found fifteen examples in the upper region of the laminarian zone. It belongs to the same group with *R. Cumingii* and *R. tenuistriata.* It differs from the former in its smaller size, more swollen whorls, and stouter varix behind the outer lip. *Cumingii* has the longitudinal ribs cut by spiral grooves.

RISSOINA SCULPTILIS, Garr., pl. 2, fig. 2.

Shell elongate-ovate, solid, shining, white; spire long, gradually tapering from the body; whorls 9?, convex, latticed with longitudinal and transverse ribs, nodose at their points of intersection; transverse ribs three on each whorl of the spire, five on the body whorl, and their interstices crossed by very fine striæ; suture deeply impressed; aperture rather large, oblique, sub-ovate; peristome thick, somewhat dilated; externally ridged at the basal sinus; columella and parietal region with a rather thick deposit of callus.

Length 8½ mill.

Hab. Viti Isles. (Coll. Garrett.)

A very rare and beautiful species, of which we found but a single specimen, very perfect except loss of apex. Its coarse latticed surface will readily distinguish it.

RISSOINA MILLECOSTATA, Garr., pl. 2, fig. 3.

Shell elongate-oblong, sub-cylindrical, rather thin, white; spire long, convex, apex acute, the upper whorls tapering more rapidly than the lower ones; whorls 11, flatly convex, closely striated with transverse elevated lines, longitudinally ribbed; ribs small, numerous, closely set, slightly oblique, gradually becoming obsolete toward the lower part of the whorls; suture deeply incised; aperture sub-ovate, nearly vertical, about a third the length of the shell; peristome thick, slightly sinuous above; basal sinus rather indistinct; columella and parietal region with a thin callus.

Length 9 mill.

Hab. Viti Isles. (Coll. Garrett.)

Only a solitary but perfect example found. Its most obvious character is its numerous ribs, transverse lines, and absence of the external rib to the outer lip.

RISSOINA ORYZA, Garr., pl. 2, fig. 4.

Shell small, oblong-ovate, solid, smooth, shining, white; spire moderately elevated, rather rapidly tapering, apex obtuse; whorls 6–7, flatly convex, the last one rather large, slightly compressed beneath; suture faintly impressed and broadly margined beneath; aperture rather large, oblique, sub-ovate; peristome thick, dilated; columella oblique.

Length 2 mill.

Hab. Viti Isles. (Coll. Garrett.)

Three examples found in beach sand at Kiva Island. It belongs to the same group with *R. curta* and *R. semiplicata*.

RISSOINA HORRIDA, Garr., pl. 2, fig. 5.

Shell small, elongate-oblong, thick, vitreous, white; spire rather long, gradually tapering from the body whorl, apex obtuse; whorls 7, longitudinally ribbed, ribs large, closely set, slightly oblique, crossed by equally large spiral ridges, two on the whorls of the spire, and four on the short body whorl, their points of intersection acutely papillose; the deep interstices with elevated transverse striæ; suture deeply incised and crenulate; aperture sub-ovate, about one-fourth the length of the shell; peristome very thick, somewhat five angled.

Length 3 mill.

Hab. Viti Isles. (Coll. Garrett.)

A very rare species remarkable for its bold sculpturing.

RISSOINA SCABA, Garr., pl. 2, fig. 6.

Shell elongate-oblong, solid, vitreous, shining, white; spire rather long, turreted, gradually tapering from the body whorl, apex obtuse; whorls 8, flatly convex, the last short and rounded, longitudinally ribbed; ribs small, rather close, compressed, slightly oblique, crossed by numerous small transverse ridges, forming granules at their points of intersection; suture deeply excavated; base obliquely grooved and ridged; aperture small, oval, oblique, and the basal sinus large; peristome very thick, margined with a stout external varix; columella oblique concave.

Length 4 mill.

Hab. Viti Isles. (Coll. Garrett.)

We obtained a single example at the above location and one at the Samoa Isles.

RISSOINA COSTATOGRANOSA, Garr., pl. 2, fig. 7.

Shell small, elongate-oblong, solid, shining, ashy-white; spire long, gradually tapering from the body whorl, apex obtuse; whorls 9, convex, the last one rounded, longitudinally granosely ribbed; ribs rather small, closely set, slightly oblique, flexuous on the last whorl, and transversely grooved; suture deeply impressed; aperture oblique, sub-ovate, two-sevenths the length of the shell; peristome thick, finely crenulate, somewhat dilated.

Length 5 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

Five specimens found under clumps of coral on reefs. It belongs to the same group with *R. Cerithiopsis*, Pse.

RISSOINA GRACILIS, Garr., pl. 2, fig. 8.

Shell small, elongate, slender, cylindrically tapering, rather thick, somewhat shining, light-brown; spire long, sub-acute; whorls 9, convex, last one short, rounded, longitudinally ribbed; ribs rather large, closely set, as wide as their interstices, slightly oblique, and flexuous on the last part of the body whorl; suture margined beneath; aperture small, sub-oval, nearly vertical; peristome thick, sinuous above and beneath; columella concave and callous.

Length 3 mill.

Hab. Viti Isles. (Coll. Garrett.)

A beautiful slender species belonging to the group of which *Rissoina ambigua*, Gl., may be considered as the type. *R. gracilis* also occurs at the Society Isles.

RISSOINA DEBILIS, Garr., pl. 2, fig. 9.

Shell elongate, slender, white; spire long, rapidly tapering from the body whorl; whorls 8, convex, the last one rounded, longitudinally ribbed; ribs small, slightly oblique, rounded, flexuous on the body whorl; interstices transversely striated with fine raised lines, which are larger and continuous at the base; suture deeply impressed; aperture oblique, sub-oval, about two-sevenths the length of the shell; peristome much thickened externally.

Length 4½ mill.

Hab. Viti Isles. (Coll. Garrett.)

A very rare species found under clumps of coral on reefs.

RISSOINA AFFINIS, Garr., pl. 2, fig. 10.

Shell elongate-oblong, rather solid, smooth, shining, white; spire moderately elevated, obtuse, somewhat rapidly tapering; whorls 7–8, convex, the last one large, swollen, slightly compressed; suture linear; aperture large, oblique, ovate, one-third the length of the shell; peristome very thick, dilated, sinuous above and beneath; columella and parietal region callous.

Length 5 mill.

Hab. Viti Isles. (Coll. Garrett.)

A rare species belonging to the same group with *R. curta*, *tridentata* and *oryza*.

RISSOINA TEREBRA, Garr., pl. 2, fig. 11.

Shell solid, elongate, subulate, ashy-white, with or without a revolving brown band; spire long, acute, tapering from the body whorl; embryonal whorls 2, smooth, normal whorls 10, convex, longitudinally strongly ribbed; ribs slightly oblique, angular, 12–13 in the penultimate whorl; interstices with minute crowded raised transverse striæ, which are most conspicuous towards the base; suture deeply impressed; aperture small, oblong-oval, oblique, less than a fourth the length of the shell; peristome trenchant on its edge, externally strongly varicose; columella and parietal region with a white callus.

Length 8½ mill.

Hab. Viti and Samoa Isles. (Coll. Phil. Acad. Nat. Sciences.)

A rare species of which we found four examples under clumps of coral on reefs.

RISSOINA TURRITA, Garr., pl. 2, fig. 12.

Shell oblong-ovate, solid, white, spire moderately elevated, turreted; whorls 10, plain, irregularly increasing, all except the body strongly tabulate, the angle sharp, and excepting the three last whorls, strongly ribbed longitudinally; ribs rounded, the same width as their interstices, and the whole surface with small close spiral elevated lines and grooves; aperture oblique, ovate, about one-third the length of the shell; peristome thick, slightly expanded, crenulate within; columella and parietal region with a rather thick deposit of callus.

Length 7 mill.

Hab. Society Isles. (Coll. Garrett.)

A very rare species found under clumps of coral on the outer reefs.

VITRINELLA PURA, Garr., pl. 2, fig. 13.

Shell small, depressed orbicular, rather thin, smooth, shining white, with faint microscopical radiating lines of growth; spire depressly conoid; whorls 4, flatly convex, rapidly and regularly increasing, last one large, rounded, slightly deflected in front, and somewhat angular near the umbilicus; suture channelled; umbilicus deep funnel-shaped, spirally grooved, nearly one-third the greatest diameter of the shell; aperture circular, oblique; peristome rather thick, nearly continuous.

Diam. Greatest 2, height 1 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

We found about thirty examples of this species in beach sand at Kiva Island. It is probably the first species recorded from the South Sea Islands.

VITRINELLA LIRICINCTA, Garr., pl. 2, fig. 14.

Shell small, depressed orbicular, shining, hyaline, white, spire but little elevated; whorls 4, convex, regularly and rapidly increasing, last one large, rounded, girdled with 9–11 ridges, which are most crowded beneath and remote above; suture linear; umbilicus large, deep, perspective, freely showing the whorls, spirally ridged a little more than a third the greatest diameter of the shell; aperture circular, diagonal; peristome nearly continuous.

Diam. Greatest $1\frac{1}{2}$, height $\frac{2}{3}$ mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

About seventy specimens of this beautiful species were gathered from the beach sand at Kiva Island.

VITRINELLA SCULPTILIS, Garr., pl. 2, fig. 15.

Shell depressly orbicular, whitish, rather thick, spire broadly and depressly conical; whorls 5, tabulate, regularly and rapidly increasing, last one very large, rounded, girdled with eight prominent ribs, the second one on the shoulder crenulate, all narrower than their interstices, excepting those on the base, which are more closely set; the crenulate and the upper plain ridge ascending the whorls of the spire; the concave interstices with crowded oblique raised striæ; suture margined by the upper ridge; umbilicus deep, exhibiting the volutions, margined by the last rib, striated with coarse oblique raised lines, and about one-third the greatest diameter of the shell; aperture circular, diagonal; peristome thick, united by a callus.

Diam. Greatest 4½, height 3 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

An elegantly sculptured species of which we found twenty examples on a sandy mud flat on the north coast of Natawa Bay, Vanna Levu.

VITRINELLA CÆLATA, Garr., pl. 2, fig. 16.

Shell small, depressly orbicular, vitreous, shining, sub-pellucid, white, spire depressly conoid; whorls 3½ angular, last one trigonal, angles slightly carinate, crossed by small closely-set rounded slightly flexuous ribs; umbilicus small, pervious; aperture diagonal, rounded; peristome thick, continuous.

Diam. Greatest 2, height 1 mill.

Hab. Viti Isles. (Coll. Garrett.)

A very rare and beautiful species, of which we found four examples in beach sand at Kiva Island.

VITRINELLA NODOSA, Garr., pl. 2, fig. 17.

Shell small, discoid, white, spire flat; whorls 3½, convex, rapidly and regularly increasing, last one rounded, sub-trigonal, transversely nodose, crossed by crowded thin elevated striæ; umbilicus large, crenulate, freely exposing the whorls; aperture oblique, rounded; peristome nearly continuous.

Diam. Greatest 2, height ½ mill.

Hab. Viti Isles. (Coll. Garrett.)

One perfect and two imperfect examples found.

CHELETROPIS CRENILABRIS, Garr., pl. 2, fig. 18.

Shell minute. ovate, thin, fragile, pellucid, shining, corneous; spire rather widely conical, a little more than half the length of the shell, apex rather obtuse; whorls 5, slightly convex, the first two with very fine oblique raised lines, the last one large, swollen; suture faintly impressed; aperture broadly oval, strongly effuse at the base; peristome thickened, ribbed externally, and the lower half crenulate on the edge; columella slightly callous and somewhat twisted.

Length 2 mill.

Hab. Paumotus Seas. (Coll. Garrett.)

Two perfect examples of this pelagic species were found on the sands at the Paumotus Islands. It differs from the figure and description of *C. Huxleyi*, Forbes.

? RISSOA VITREA, Garr., pl. 2, fig. 19.

Shell minute, ovate, thin, pellucid, smooth, shining, white; spire conical, obtuse; whorls 5, strongly convex, last one large, rounded; suture well impressed, margined; aperture sub-circular, nearly one-third the length of the shell; peristome rather thick.

Length 1½ mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

Not uncommon in beach sand at Kiva Island.

? RISSOA LITTORINÆFORMIS, Garr., pl. 2, fig. 20.

Shell small, ovate, smooth, shining, pellucid, white; spire conical, obtuse; whorls 5½, strongly convex, last one very large, rounded; suture deeply impressed, slightly margined; aperture sub-circular, nearly one-third the length of the shell; peristome rather thick.

Length, 2 mill.

Hab. Viti Isles. (Coll. Garrett.)

Two examples found with the preceding species, to which it is closely allied.

RISSOA INFRASTRICTA, Garr., pl. 2 fig. 21.

Shell small, oblong, thick, shining, white, spire rather long, obtuse; whorls 5, strongly convex, constricted at the base, and slightly so next the suture, longitudinally ribbed, ribs large, abruptly terminating at the basal stricture; aperture roundly ovate one-third the length of the shell; peristome thick, with an external rib.

Length 2 mill.

Hab. Viti Isles. (Coll. Garrett.)

A single specimen found with the two preceding species.

? RISSOA INFRATINCTA, Garr., pl. 2, fig. 22.

Shell small, elongate, turreted, rather thin, sub-pellucid, shining, ashy-white, with a brown tinge at the base; spire long, acute; whorls 8, rounded, clathrate with longitudinal and smaller revolving ribs; suture deeply impressed; aperture small, sub-ovate, about one-fourth the length of the shell; peristome thin, with a slight angle at its union with the arched columella.

Length 2½ mill.

Hab. Viti Isles, Samoa Isles. (Coll. Garrett.)

A few examples occurred under stones near low-water mark. The general aspect of the shell is like some of the small species of *Bittium*.

RISSOA VENUSTA, Garr., pl. 2, fig. 23.

Shell small, elongate-ovate, solid, vitreous, shining white; whorls 7 ? convex, spirally ridged, ridges large, crenulate, compressed, five on the body whorl, the upper two continued up the spire, the interstices latticed with small compressed ribs; suture deeply impressed, margined; aperture oval, slightly oblique, one-third the length of the shell; peristome very thick, externally ribbed, margins united by a callosity; columella and parietal region arched.

Length 3½ mill.

Hab. Viti Isles. (Coll. Garrett).

A very rare species, remarkable for the beauty of its sculpturing.

? RISSOA CRYSTALLINA, Garr., pl. 2, fig. 24.

Shell small, ovate, thin, sub-pellucid, vitreous, shining, white; spire conical, obtuse; whorls 5, convex, last one very large, rounded, longitudinally ribbed; ribs small, slightly oblique, evanescent on the lower part of the body whorl, the whole surface with smaller spiral ridges; suture deeply impressed; aperture sub-circular, vertical, slightly angulate above, a little more than a third the length of the shell; peristome thickened; columella arched, callous.

Length 2 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A few examples picked up on the sandy beaches at Kiva Island.

? Rissoa hyalina, Garr., pl. 2, fig. 25.

Shell elongate-oblong, sub-cylindrical, thin, hyaline, shining, white; spire long, obtuse; whorls 6–7, convex, with very fine crowded revolving raised striæ, crossed by more delicate lines of growth; suture deeply impressed; aperture roundly-ovate, vertical, one-third the length of the shell; peristome rather thick, slightly expanded at the base, margins united by a callosity; columella arched.

Length 6 mill.

Hab. Samoa, Viti, and Paumotus Isles. (Coll. Phil. Acad. Nat. Sciences.)

A very rare and beautiful species of which we found eight examples at the above groups of islands.

Rissoa truncata, Garr., pl. 2, fig. 26.

Shell small, oblong, thin, cylindrical, pellucid, shining, white; spire moderately long, apex truncate; whorls 5, convex, the three last of nearly equal width, with fine crowded raised revolving striæ; suture deeply impressed; aperture roundly-ovate, vertical, little less than one-third the length of the shell; peristome thick, slightly expanded, margins united by a callosity; columella arched.

Length 2 mill.

Hab. Viti Isles. (Coll. Garrett.)

We found five examples of this species in beach sand at Kiva Island. It is closely allied to the preceding species, but differs in size, coarser striæ, more truncate apex, and less tapering spire.

Volvaria (Volvarina) pygmæa, Garr., pl. 2, fig. 27.

Shell very small, ovate, smooth, glossy, white; spire depressly conoid; aperture narrow, linear; peristome abbreviately lyrate within, and slightly everted towards the base; columella with 4–5 plaits.

Length 2½ mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

Not uncommon in the condition of beach-worn specimens.

Drillia vidualoides, Garr., pl. 2, fig. 28.

Shell sub-claviform, solid, spire long, acute, ashy-white, lower half of the last whorl chestnut-brown; whorls 7–8, concave beneath the suture, girdled with a revolving row of large oblong nodules, about eight on each whorl; aperture oval, varied with white and

chestnut-brown, about one-third the length of the shell; canal very short, wide and truncate; sinus large, deep, and rounded; peristome sharp, arched, and slightly sinuous near the base; columella smooth, callous, and a wart-like callosity next the sinus.

Length 10 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

An abundant species living on masses of dead coral in the lower region of the littoral zone. It closely resembles *D. vidua*, Rve., which we also collected both at the Viti, and at Wallis Island, and were invariably found on weedy ground, most generally buried in sandy mud. Our species has the nodules on the body whorl less acute, and *vidua* has the base of the shell more or less whitish and there is always a row of granules on the lower half of this body whorl.

DRILLIA PAPILLOSA, Garr., pl. 2, fig. 29.

Shell small, elongate-oblong, solid, spire moderately elevated, yellowish-white; whorls 8, convex, constricted beneath the suture, spirally granulose; granules rather large, three rows on the whorls of the spire, the lower one obsolete; base contracted, spirally ridged and produced into a short, obtuse, open canal; aperture sub-ovate, small, nearly a third the length of the shell; posterior sinus large, deep, and rounded; peristome rather acute, slightly sinuous near the base; columella smooth, callous, nearly vertical.

Length 6 mill.

Hab. Viti Isles. (Coll. Garrett.)

Only a single but perfect example of this small species was found.

DRILLIA MINUTISSIMA, Garr., pl. 2, fig. 30.

Shell minute, elongate ovate, solid, spire rather short, light-brown; whorls 6, spirally granulated, granules rather large, closely set, disposed in two rows on the whorls of the spire, the lower one the larger; base contracted, spirally ridged; aperture ovate, deep-brown, one-third the length of the shell; posterior sinus large, circular, margins nearly united; peristome rather sharp and strongly arched; columella smooth, nearly vertical.

Length 2 mill.

Hab. Viti Isles. (Coll. Garrett.)

Two perfect specimens were found under clumps of coral on reefs.

DRILLIA PUSILLA, Garr., pl. 2, fig. 31.

Shell small, oblong, sub-fusiform, solid, slightly shining, ashy-white, the lower portion of the whorls grayish-brown; spire rather long, convex in outline, apex sub-acute; whorls 6–7, convex, slightly constricted beneath the suture, last one contracted at the base and furnished with a stout varix on the right side; longitudinally ribbed, ribs small, slightly oblique, somewhat flexuous, sub-angular, slightly nodulous next the suture, about 15 on the whorls of the spire; base spirally ridged and grooved; canal short, rather widely open, truncate; aperture light-brown, oblong oval, about one-third the length of the shell; sinus large, rounded; peristome rather sharp, furnished with a small sinus near the base.

Length 7 mill.

Hab. Viti Isles, Cook's Isles, Paumotus Isles. (Coll. Phil. Acad. Nat. Sciences.)

Several examples found under stones on the inner reefs. It differs from *D. pygmæa*, Dkr., found at the former location, in its more slender form, longer spire, and is more distinctly constricted beneath the suture.

CLATHURELLA PULCHELLA, Garr., pl. 3, fig. 32.

Shell small, oblong ovate, solid, slightly shining, violaceous, or pinky-red, with a narrow white band; spire moderate, sub-turreted, convex in outline, apex sub-acute; whorls nuclear 3, smooth, normal whorls 5–6, convex, longitudinally ribbed, ribs rather large, rounded, slightly oblique, 11–13 on the body whorl, crossed by numerous spiral elevated lines; suture deeply impressed; aperture elongate, narrow, slightly flexuous, nearly half the length of the shell; peristome thick, 5–6 toothed within; sinus rounded; columella depressed, smooth.

Length 5 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A very beautiful species found lurking under stones on the fringing reefs. It belongs to the same group with *C. rugosa*, *violacea* and *maculosa*.

CLATHURELLA DÆDALEA, Garr., pl. 2, fig. 33.

Shell elongate, solid, slightly glossy, yellowish-white, maculated with small irregular chestnut-brown spots, mostly confined to the ribs; spire long, turreted, apex acute; whorls embryonal 3, brown,

normal whorls 7, tabulate above, convex, last one produced into a short open slightly recurved canal; longitudinally ribbed, ribs small, compressed, rounded, slightly oblique, 13–14 on the body whorl, crossed by small, revolving elevated lines, forming granules where they intersect the ribs; aperture oblong, sub-rhomboid; posterior sinus very deep, ovate; peristome strongly varicose externally, rather acute, crenulate, and abbreviately lyrate within; columella faintly rugose with oblique wrinkles, nearly vertical, and together with the parietal region thinly callous.

Length 8 mill.

Hab. Viti Isles. (Coll. Garrett.)

A very rare and beautiful species found on the outer reefs.

CLATHURELLA CÆLATA, Garr., pl. 2, fig. 34.

Shell small, oblong, fusiform, rapidly tapering towards the base, spire moderately elevated, apex acute; whorls embryonal 2, brown, normal whorls 6, rounded, last one produced into a short, slightly recurved canal; longitudinally nodosely ribbed, 10 on the body whorl, crossed by smaller revolving ridges, 3 on the penultimate whorls, 10–11 on the body, interstices scabrous with close, elevated longitudinal striæ; suture deeply impressed; aperture oblong, narrow, sides nearly parallel, half the length of the shell; posterior sinus large, rounded; peristome trenchant, obsoletely crenulate, with 5 stout teeth on its inner edge; columella nearly vertical, smooth; color cinereous, stained with luteous, nodules whitish and obsoletely lineated in the spiral grooves.

Length 6 mill.

Hab. Viti Isles. (Coll. Garrett.)

A rare and beautifully sculptured species of which we found two living specimens on the outer reefs.

CLATHURELLA INFRASULCATA, Garr., pl. 2, fig. 35.

Shell solid, oblong, turreted, spire rather long, yellowish-gray; whorls 6–7, convex, roundly shouldered above, longitudinally ribbed; ribs rounded, 10 on the body whorl, crossed by closely-set small transverse ridges; base obliquely sulcate, the grooves crossed by the longitudinal ribs; canal short, broad truncate; aperture oblong, sub-rhomboid, nearly one-third the length of the shell; peristome with a stout external rib, abbreviately lyrate along the inner edge; posterior sinus large, deeper than broad; columella smooth.

Length 7 mill.

Hab. Viti Isles. (Coll. Garrett.)

A rare species remarkable for the deep sulcate base.

CLATHURELLA OBESA, Garr., pl. 2, fig. 36.

Shell oblong, fusiform, spire moderately elevated, turreted, apex acute, base contracted, pale luteous; whorls 7, convex, the last one ventricose, tabulate above, longitudinally ribbed; ribs small, prominent, rounded, 16 on the body whorl, crossed by numerous small transverse ridges, of which there are five on the penultimate whorl; aperture elongate oblong, slightly flexuous, half the length of the shell; the posterior sinus large, sub-ovate; peristome faintly crenulate, labiate and eight-toothed within; columella rugose with oblique ridges.

Length 9 mill.

Hab. Viti Isles. (Coll. Garrett.)

A very rare species closely allied to *C. lutea*, Pse., from which it may be distinguished by its stouter ribs, more robust form, more distinctly tabulated whorls, and longer aperture.

CLATHURELLA SEMILINEATA, Garr., pl. 2, fig. 37.

Shell small, oblong, sub-fusiform, slightly shining, cinereous, with four or five transverse brown lines on the upper whorls and three near the base; spire rather long, acute, base much contracted; nuclear whorls 3, wrinkled, brown, normal whorls 5–6, flatly convex, longitudinally ribbed; ribs rather stout, rounded, transversely nodose, 12 on the body whorl, interstices with small transverse ridges which form the nodules on the ribs; aperture elongate oblong, narrow sides nearly parallel, about a third the length of the shell; posterior sinus large, rounded; peristome with 6–7 teeth on the inner edge.

Length 5 mill.

Hab. Samoa and Viti Isles. (Coll. Garrett.)

We found ten examples of this pretty species under clumps of coral on the outer reefs. Its most obvious character is the two groups of lineations, which are constant. It belongs to the group represented by *C. felina*, Hds. and *C. violacea*, Pse.

CLATHURELLA PINGUIS, Garr., pl. 2, fig. 38.

Shell small, ovate, fusiform, solid, base contracted, spire short, rose-red with a single revolving white band; nuclear whorls 2,

white, smooth, normal five, rounded, longitudinally ribbed; ribs large, rounded, wider than their interstices, ten on the body whorl, crossed by small revolving ridges, which form transverse nodules in mounting over the ribs; aperture elongate, linear, slightly flexuous, about half the length of the shell; posterior sinus large, rounded; peristome thick, finely crenulate, slightly involute, the inner margins with 5–6 closely-set teeth; columella smooth.

Length 4 mill.

Hab. Samoa and Viti Isles. (Coll. Garrett.)

A very rare species, of which we obtained a single example at each of the two above localities.

CLATHURELLA PUNCTIFERA, Garr., pl. 2, fig. 39.

Shell small, elongate-oblong, thick, base contracted, spire long, acute, sides convex, cinereous, dotted with light-brown, the dots disposed in regular series on the ribs; nuclear whorls 3, light-brown, obliquely plicate-striated; normal whorls 5–6, flatly convex, longitudinally ribbed, ribs small, rounded, narrower than their interstices, 10–11 on the body whorl, crossed by smaller transverse ridges, four on the penultimate whorl; aperture oblong, narrow, a little more than a third the length of the shell; posterior sinus rather large, semicircular; peristome externally varicose, slightly involute, crenulate, and the inner margin with six teeth; columella smooth, callous.

Length 5 mill.

Hab. Society, Samoa, and Viti Isles. (Coll. Garrett.)

We obtained a few examples of this species on the outer reefs. It belongs to the same group as *C. pumila*, *violacea*, and *felina*, which some of the European conchologists refer to the sub-genus *Crassispira*, of the genus *Drillia*.

CITHARA MELANOSTOMA, Garr., pl. 2, fig. 40.

Shell elongate-oblong, rather solid, base contracted, cinereous or whitish, with a brown-black columella, and most generally with a transverse row of linear dots between the ribs on the body-whorl; spire long, turreted, sub-acute; whorls 5–6, obliquely tabulate above, prominent at the angle, longitudinally ribbed; ribs large, remote, compressed, descending from the suture, 5–6 on the body whorl, interspaces concave, smooth; aperture elongate-oblong, nearly a third the length of the shell; base produced into a short, open, truncate canal, and the posterior sinus large, deep, semi-cir-

cular; peristome sharp, slightly involute, simple; columella and parietal region smooth, callous.

Length 10 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

We gathered about forty examples of this remarkable species on the sandy beaches at Kiva Island. It probably inhabits deep water. It may be easily known by its dark columella, simple lips, large sinus, and turreted spire.

CITHARA ABBREVIATA, Garr., pl. 3, fig. 41.

Shell small, abbreviate, sub-rhomboidal, solid, white; spire short, pyramidal, outline flattened, apex sub-acute; whorls 7, flat, the last very large, ventricose, depressed beneath the suture, sub-angulated on the shoulder and rapidly tapering to the base; surface cancellated by small close longitudinal ribs and five transverse raised lines; aperture narrow, sub-elliptical, a little more than half the length of the shell; sinus semicircular; peristome trenchant, stoutly ribbed externally, and the inner margin callous; columella slightly concave, smooth, thinly callous.

Length 5 mill.

Hab. Paumotus Isles. (Coll. Garrett.)

A very rare species. Its most obvious character is its short subrhomboid contour, short body, and cancellated surface.

ODOSTOMIA DENSECOSTATA, Garr., pl. 3, fig. 42.

Shell small, oblong, thin, sub-pellucid, somewhat glossy, cinereous; spire long, gradually tapering from the body whorl, slightly convex in outline, apex sub-acute; whorls 7, convex, longitudinally ribbed, ribs small, smooth, closely set, rounded, slightly constricted next the suture; interstices with closely-set transverse impressed striæ; suture deeply impressed; aperture vertical, ovate, angular above, about one-fourth the length of the shell; peristome thin; columella callous, arched, and the fold stout.

Length 4 mill.

Hab. Samoa and Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

Not uncommon under stones on reefs.

ODOSTOMIA EXILIS, Garr., pl. 3, fig. 43.

Shell small, elongate subulate, fragile, pellucid, shining, white; spire long, gradually tapering from the body whorl, apex sub-acute; whorls 6–8, convex, longitudinally finely striated; suture

well impressed; aperture sub-vertical, ovate, one-fourth the length of the shell; peristome acute; columella fold small.

Length 4 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A very delicate species of which we found seven examples in beach sand. It is closely allied to *O. striata*, Pse., but differs in its smaller size, and absence of the fine spiral striæ.

ODOSTOMIA DENSESTRIATA, Garr., pl. 3, fig. 44.

Shell elongate, subulate, thin, pellucid, shining, white; spire very long, gradually tapering, apex acute; whorls 11, flatly convex, spirally striated with fine crowded raised lines, crossed by more delicate lines of growth; suture impressed; aperture sub-vertical, sub-ovate, nearly one-sixth the length of the shell; peristome thin, sinuous, slightly expanded at the base; columella thinly callous, slightly reflexed, and the plait rather small.

Length 9 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

An elegant species of which we found several examples on weedy ground in the lower region of the littoral zone. It also occurs at the Samoa Islands. The general aspect of the shell is much like *O. debilis*, Pse., which has a less number of whorls, and differs in color.

ODOSTOMIA ORYZA, Garr., pl. 3, fig. 45.

Shell small, elongate-ovate, thin, smooth, glossy, white; spire moderately elevated, convex in outline, apex obtuse; whorls 7, flatly convex; suture faintly impressed, broadly margined beneath; aperture acutely ovate, one-fourth the length of the shell; peristome simple; columella concave, slightly callous, and the plait rather small.

Length 3½ mill.

Hab. Viti Isles. (Coll. Garrett.)

Only two specimens obtained from beach sand at Kiva Island.

ODOSTOMIA SULCATA, Garr., pl. 3, fig. 46.

Shell rather solid, elongate, subulate, sub-pellucid, shining, white; spire very long, sides flattened in outline, base rimate; whorls 12? (apex fractured; whorls remaining 10) plain, the last one short, rounded, all vertically grooved, grooves rather large, closely set, concave, wider than their interstices, gradually dis-

appearing on the back of the body whorl; suture deeply impressed; aperture ovate, slightly oblique; peristome rather sharp, straight, somewhat thickened at the base; columella concave, reflexed, with a stout plait, and together with the parietal region callous.

Length 8½ mill.

Hab. Viti Isles. (Coll. Garrett.)

One example found perfect except loss of apex. The sulcations do not quite extend to the sutural line, nor descend more than half way down the length of the body whorl. The whorls are very short, and appear as if pressed into each other from above.

ODOSTOMIA AMANDA, Garr., pl. 3, fig. 47.

Shell small, elongate-oblong, rather thin, sub-pellucid, somewhat shining, cinereous; spire long, gradually tapering from the body whorl, apex obtuse; whorls 7, convex, longitudinally ribbed, ribs small, smooth, rounded, constricted beneath the suture, forming a row of granules; interstices concave, the same width as the ribs, and transversely impressly striated; suture deeply impressed and crenulate; aperture sub-ovate, acutely angular above, nearly a fourth the length of shell; peristome thin, straight; columella simple.

Length 3 mill.

Hab. Viti Isles. (Coll. Garrett.)

One perfect example found on weedy ground in the middle region of the littoral zone. It is well characterized by its delicate sculpturing and the absence of the usual collumella fold. The last character, though negative, will scarcely remove it from the genus, as the nuclear whorls are sinistral. It is closely allied to *O. dense-costata*, Nob., but is much smaller, more slender, the spire longer, and the ribs more decidedly constricted beneath the suture.

ODOSTOMIA PULCHRA, Garr., pl. 3, fig. 48.

Shell elongate, slender, thin, slightly shining, white; spire long, turreted, regularly tapering from the body whorl, apex obtuse, base slightly produced; whorls 7, convex, shouldered above, longitudinally ribbed; ribs small, remote, angularly rounded, narrower than their interstices, which latter are concave, minutely and closely ridged transversely; suture deeply impressed; aperture oblong oval, slightly oblique, nearly a fifth the length of the

shell; peristome thin; columella arched, slightly callous, and the plait small and very oblique.

Length 4½ mill.

Hab. Viti Isles. (Coll. Garrett.)

A single perfect and an immature example found washed up on the sands. It may be distinguished by its shouldered whorls, distant ribs, and hyaline structure.

ODOSTOMIA CRYSTALLINA, Garr., pl. 3, fig. 49.

Shell elongate, subulate, rather thick, sub-pellucid, smooth, shining white; spire long, outlines slightly convex, apex acute; whorls 11–12, nearly plain, last one short, rounded, cancellated with microscopical longitudinal and transverse striæ; suture impressed; aperture vertical, broad ovate, acutely angular above, rounded below, about one-fifth the length of the shell; peristome thin, simple; columella arched, callous, and the plait stout.

Length 7½ mill.

Hab. Viti Isles. (Coll. Garrett.)

Two perfect examples found on a sandy mud-flat. Deep in the throat may be observed several exceedingly delicate revolving lamellæ, which, as seen through the sub-pellucid shell, look like engraved lines.

ODOSTOMIA LUTEA, Garr., pl. 3, fig. 50.

Shell elongate, subulate, smooth; shining, luteous-yellow; spire long, the upper half tapering more rapidly than the lower; apex acute; whorls 9–10, flatly convex, last one sub-angulate near the base, obsoletely striated by lines of growth; suture impressed and margined beneath; aperture widely ovate, about one-fourth the length of the shell; peristome thin, nearly straight, obsoletely angulated at the base; columella slightly callous, somewhat reflexed so as to form a slight umbilical fissure, and distinctly plaited.

Length 7 mill.

Hab. Viti Isles. (Coll. Garrett.)

Three examples found on a sandy mud-flat.

ODOSTOMIA OBELISCUS, Garr., pl. 3, fig. 51.

Shell elongate, subulate, thin, hyaline, white; spire long, flattened in outline, apex acute; whorls 10, plano-convex, the last one short, rounded, decussated by microscopical longitudinal

lines and transverse impressed striæ; suture linear, margined; aperture broadly ovate, vertical, acutely angular above, nearly a fourth the length of the shell; peristome sharp, slightly sinuous; columella thinly callous, slightly concave, somewhat reflexed, and the plait rather small.

Length 6½ mill.

Hab. Viti Isles. (Coll. Garrett.)

We found three examples of this thin, hyaline species on weedy ground in the lower region of the littoral zone.

ODOSTOMIA VITREA, Garr., pl. 8, fig. 52.

Shell elongate, subulate, thin, vitreous, smooth, shining, pellucid, white; spire very long, regularly tapering from the body whorl, apex acute, base slightly produced, whorls 11, nearly plain; last one rounded, faintly striated by lines of growth; suture linear and rather widely margined beneath; aperture, ovate, acutely angular above, with revolving thin lamellæ deep in the throat, which, as seen through the transparent shell appear like revolving lines; peristome thin, straight, slightly expanded at the base; columella concave, callous, slightly reflexed, forming a small umbilical fissure, and the spiral fold stout; parietal region thinly callous.

Length 7½ mill.

Hab. Viti Isles. (Coll. Garrett.)

Only a solitary specimen found; but quite distinct from *O. obeliscus*, Nob., which it resembles. The latter has no internal spiral lamellæ, and is impressly striated transversely.

ODOSTOMIA UNILINEATA, Garr., pl. 3, fig. 53.

Shell slender, elongate, subulate, smooth, shining, sub-pellucid, white, with a revolving yellowish-brown line just above the suture; spire very long, cylindrically tapering; whorls 10–11? (apex fractured; whorls remaining 9) plano-convex, last one slightly produced at the base, under the lens rudely striated with lines of growth; suture deeply impressed; aperture oblique, ovate, acutely angular above, lyrate within, lyræ very delicate, several in number, revolving in the interior of the shell; peristome thin, simple; columella concave, slightly reflexed, and the revolving fold stout.

Length 10½ mill.

Hab. Viti Isles. (Coll. Garrett.)

Only a single example of this fine species was found. It may

be compared with *O. aciculina*, Sowr., from New Caledonia. A compared with the description and figure our shell is longer, more slender, the spire more plain in outline, the base less produced and has one line less.

ODOSTOMIA CUSPIDATA, Garr., pl. 3, fig. 54.

Shell elongate, subulate, slender, smooth, shining, creamy-white with a microscopical articulate darker line on the middle of the whorls; spire very long, cylindrically tapering, apex obtuse whorls 13–15, plano-convex, the last one stout, rounded, rudely striated by lines of growth; suture deeply impressed; aperture broadly ovate, angulate above, about one-seventh the length of the shell; deep in the throat may be seen several revolving fine lamellæ; peristome thin, slightly expanded at the base; columella callous, reflexed so as to form a slight umbilical fissure, and the spiral fold stout.

Length 11 mill.

Hab. Viti Isles. (Coll. Garrett.)

We found three perfect examples of this fine species on weedy ground in the middle region of the littoral zone.

Genus **RISSOPSIS**, Garr.

Shell small, thin, elongate, cylindrical; apex truncate; aperture sub-ovate, angular above, entire; peristome rather thin, somewhat expanded; columella oblique, arched.

RISSOPSIS TYPICA, Garr. pl, 3, fig. 55.

Shell small, elongate, slender, thin, hyaline, glossy, smooth, white; spire long, cylindrical, slightly tapering, sides nearly plain, apex truncate; whorls 6, flat; suture faintly impressed, margined; aperture vertical, ovate-triangular, nearly one-third the length of the shell; peristome rather thin, sinuous, somewhat expanded; columella obliquely arched, slightly callous.

Length 10 mill.

Hab. Viti and Samoa Isles. (Coll. Garrett.)

We found three specimens of this delicate transparent shell on the outer reefs.

OBELISCUS HYALINUS, Garr. pl. 3, fig. 56.

Shell small, elongate-oblong, sub-cylindrical, thin, smooth, hyaline, white; spire long, turreted, the upper whorls tapering more

rapidly than the lower, apex acute, base slightly produced; whorls 9, convex, the last one rounded, under the lens minutely striated by lines of growth and very fine close revolving impressed lines; suture deeply impressed and margined beneath; aperture slightly oblique, rhomboid-luniform, about one-third the length of the shell; peristome rather thin, straight; columella slightly callous, with two oblique plaits.

Length 10 mill.

Hab. Paumotus and Society Isles. (Coll. Garrett.)

A very rare species of which we found a single example at each of the above-mentioned locations.

NASSA ANTHRACINA, Garr., pl. 8, fig. 57.

Shell small, oblong-ovate, solid, shining, black or deep blackish-brown, with a transverse light-brown line on the upper half of the body whorl; spire rather long, apex sub-acute; whorls embryonal 3, smooth, amber color, normal whorls 4–5, convex, with fine revolving impressed lines; aperture sub-oval, little more than one-third the length of the shell; peristome rather thick, straight, externally varicose, inner margin with 5–6 oblong teeth; columella arched, callous, with a small oblique plait next to the basal sinus; parietal region with a small ridge.

Length 7 mill.

Hab. Viti Isles. (Coll. Garrett.)

We found only two examples of this species, both obtained on weedy bottom near low-water mark. The pale line is most conspicuous in the aperture.

DAPHNELLA FUSIFORMIS, Garr., pl. 3, fig. 58.

Shell oblong, fusiform, rather solid, white, faintly tinged with yellowish-brown; spire acutely conical, half the length of the shell; whorls embryonal 3, rugose, brownish-horn color; normal whorls 6, convexly angular, last one very large, swollen, much contracted and produced at the base; longitudinally ribbed, ribs small, closely set, rounded, becoming obsolete on the body whorl, which latter exhibits several periodical varices; whole surface with numerous small unequal-sized, more or less crenulate revolving ridges; aperture elliptically oval, half the length of the shell; peristome thick, finely crenulate, arched, sinus small; columella smooth and polished.

Length 8 mill.

Hab. Paumotus Isles. (Coll. Garrett.)

A very rare species, remarkable for its fusiform outline, and attenuated base.

DAPHNELLA MILLEGRANA, Garr., pl. 3, fig. 59.

Shell elongate-oblong, sub-fusiform, moderately thick, slightly shining, white with short transverse ferruginous lines and dots; spire rather long, conical, convex in outline, apex sub-acute; whorls embryonal 3, smooth, dark corneous, whorls normal 5, convex, last one large, contracted at the base; whole surface decussated by crowded small longitudinal and spiral elevated lines, granulated at their points of intersection; aperture large, elliptically oblong, contracted above, a little more than half the length of the shell; peristome moderately thick, delicately crenulate, and the sinus large and deep; columella concave.

Length 9 mill.

Hab. Paumotus Isles. (Coll. Garrett.)

A very rare and beautiful species characterized by its narrow eliptical form and delicate clathrate sculpturing.

DAPHNELLA VITREA, Garr., pl. 3, fig. 60.

Shell small, elongate, thin, vitreous, sub-pellucid, shining, white; spire long, turreted, acutely conical, apex acute; whorls embryonal 3, rugose, brownish, normal whorls 8, convex, angulately shouldered above, last one contracted at the base into a short open canal; whole surface with fine rugose elevated spiral lines, most conspicuous on the upper whorls, which are longitudinally ribbed; each whorl with two periodical varices; aperture oblong, oval, about a third the length of the shell; peristome rather sharp, finely crenulate, margined externally by a small varix; columella simple; posterior sinus large and very deep.

Length 8 mill.

Hab. Paumotus Isles. (Coll. Garrett.)

A very rare species well characterized by its vitreous structure, revolving lines, and remote varices. It belongs to the same group as *D. Boholensis* and *lactea.*

DAPHNELLA TESSELLATA, Garr., pl. 3, fig. 61.

Shell elongate, sub-fusiform, rather thin, slightly shining, white, tessellated with small sub-quadrangular ferruginous spots disposed in transverse rows, 3 on the body and 1 on each whorl of

the spire; spire moderately elevated, acutely conical; whorls embryonal 3, light-brown, wrinkled, normal whorls 4–5, convex, last one rather long, tapering at the base; whole surface decussated by fine crowded longitudinal and transverse elevated lines, which are minutely granulated at their points of intersection; aperture narrow elliptical, nearly half the length of the shell; sinus large and deep; peristome rather thick, finely crenulate, and slightly sinuous near the base; columella smooth, nearly vertical.

Length 10 mill.

Hab. Paumotus Isles. (Coll. Phil. Acad. Nat. Scinces.)

We found about a dozen examples of this species washed up on the beaches, all of which have the peculiar tessellations. In shape and sculpturing it closely resembles *D. millegrana*, but is more contracted at the base.

DESCRIPTION OF A NEW SPECIES OF GONIODORIS.

BY ANDREW GARRETT.

GONIODORIS TRYONI, Garr., pl. 4.

Animal oblong, smooth, soft, convex on the dorsal region, and the body deep. The mantle is narrow, rounded and somewhat dilated in front, acutely rounded posteriorly, margins thin and slightly gashed. The dorsal tentacles, which issue from simple cavities, are rather distant from each other, oblong, sub-trigonal in shape, pointed and very finely lamellated. The branchial star is rather large, wider than the mantle, and is composed of twenty-four plumes which are more or less forked. Anal tube prominent. Labial appendages small and conical. The large foot is elongate, and projects far behind the mantle.

Color creamy-white, the mantle and foot margined with violet, and, together with the sides of the body, decorated with a few small, scattered, roundish, deep black ocellii, encircled with opaque white rings which are shaded off with light umber. The dorsal tentacles are light umber, gradually passing into violet above, and the lamellæ, together with an anterior and posterior vertical line, white. The branchial plumes are pale tawny flesh, edged with light umber, and the tips violet.

Length 71 mill.

Hab. Society Isles. (Mus. Godeffroy, Hamburg.)

DESCRIPTIONS OF NEW SPECIES OF LAND SHELLS INHABITING THE SOUTH SEA ISLANDS.

BY ANDREW GARRETT.

PUPINA VITIENSIS, Garr., pl. 3, fig. 62.

Shell imperforate, oblong-ovate, moderately thick, sub-translucent, smooth, polished, shining, corneous; spire rather tumid, acutely rounded at the apex; suture margined; whorls 6, slightly convex, right side more flattened than the left, penultimate equal in size to the preceding 4 whorls; aperture slightly oblique, bicanaliculate, semicircular; peristome whitish, thickened, somewhat expanded below; columella and parietal region concave, margined by an arched rib, the former terminating in a prominent rounded tongue.

Length 7 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A rare species found among decayed vegetation in damp forests at Gomea Island, where it is peculiar. It is the first recorded species from the Viti group.

HELICINA GOMEAENSIS, Garr., pl. 3, fig. 63.

Shell depressly trochiform, thin, sub-pellucid, somewhat glossy, under a lens faint, rude, revolving, impressed striæ and slight radiating lines of growth; color light straw-yellow, rarely with two broad brownish-red spiral bands; spire broadly conical, apex obtuse; whorls 5, convex, last one slightly angular at the periphery, not deflected in front; basal callus thin, granulate; suture linearly impressed; aperture diagonal, sub-triangular luniform, white within; peristome slightly labiate, white, under a lens granulate, flatly expanded, somewhat sinuous above, and angular at its junction with the columella.

Diam., greatest 10½, height 8 mill.

Hab. Gomea I., Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

Not uncommon on the foliage of bushes at the above-mentioned island, where it is peculiar.

PITYS MAUPIENSIS, Garr., pl. 3, fig. 64.

Shell umbilicate, sub-discoid, thin, sub-pellucid, elevately striated, striæ crowded, finer beneath, brownish, more or less tessel-

lated with dark-brown, and sometimes the body adorned with zigzag stripes; spire convex, apex flat; suture rather deeply impressed; whorls 6½, rounded, regularly and slowly increasing, the last one slanting from the shoulder towards the base; umbilicus small, but deep, about one-fifth the greatest diameter of the shell; aperture vertical, narrow, luniform, fauces with four, columella with one, and the parietal region with three lamellæ; peristome thin, simple.

Diam. 3, height 1½ mill.

Hab. Maupiti I., Society Isles. (Coll. Phil. Acad. Nat. Sciences.)

A common species found under decayed wood. It belongs to the same group as *P. modicella* and *P. contorta.*

PITYS TANEÆ, Garr.. pl. 3, fig. 65.

Shell umbilicate, discoid, thin, sub-pellucid, brownish-horn color, tessellated and rayed with deep-brown, plicately ribbed; ribs small, oblique, arcuately curved, somewhat irregular, rather distant, finer and more crowded beneath; spire convex, flattened at the apex; whorls 6½, convex, slowly and regularly increasing, slightly sulcate next the suture, last one acutely carinate, flattened above, not descending in front, convex beneath, angular at the umbilicus; suture well impressed; umbilicus large, perspective, freely showing the whorls, a little more than a third the diameter of the shell; aperture oblique, rhomboid-lunate, wider than high; parietal region with a small revolving lamella; peristome thin, simple.

Diam. 4½, height 1½ mill.

Hab. Maupiti I., Society Isles. (Coll. Phil. Acad. Nat. Sciences.)

A very abundant species found on the ground on the sides of wooded hills. It belongs to the same group as *P. ficta, fabrefacta,* and *Huahinensis.*

PITYS ZEBRINA, Garr., pl. 3, fig. 66.

Shell umbilicate, sub-discoid, thin, pellucid, shining, whitish, corneous, adorned with brown tessellations on the spire, and flexuous stripes on the body whorl; spire depressly convex, apex flattened; whorls 5½, convex, slowly and regularly increasing, last one not descending in front, rounded, obliquely ribbed; ribs membranous, rather distant, interstices under the lens clearly elevately striated; suture deeply impressed; umbilicus small, pervious, one-sixth the greatest diameter of the shell; aperture sub-vertical,

roundly luniform, wider than high, fauces with three, and the parietal region with two lamellæ; peristome thin, simple.

Diam. 4, height 1½ mill.

Hab. Rarotonga I., Cook's Isles. (Coll. Phil. Acad. Nat. Sciences.)

A beautiful species, well characterized by its conspicuous spots and stripes on a pale ground, membranous ribs and fine lamellæ. It belongs to the same group as *P. modicella*, *contorta*, and *multilamellata*.

PITYS UNILAMELLATA, Garr., pl. 3, fig. 67.

Shell umbilicate, sub-discoid, thin, corneous, tessellated, and rayed with brown, plicately ribbed, ribs compressed, rather closely set, regular, oblique, flexuous, finer and more crowded beneath; spire depressly convex, apex prominent; whorls 5, convex, slowly and regularly increasing, last one not descending in front, obtusely sub-angular on the periphery, and more distinctly so on the umbilical region; suture channelled; umbilicus large, freely exposing the whorls, nearly one-third the greatest diameter of the shell; aperture oblique, somewhat rhomboid luniform, wider than deep; parietal region with a single small lamella; peristome thin, simple.

Diam., greatest 4½, height 2 mill.

Hab. Rarotonga I., Cook's Isles. (Coll. Phil. Acad. Nat. Sciences.)

A rare species found under decayed vegetation in mountain ravines.

PLECOTREMA TURRITA, Garr. pl, 3, fig. 68.

Shell sub-perforate, solid, more or less acutely ovate, turreted, transversely finely ridged, ridges closely set, granulated, interstices crossed by raised lines, corneous with white lips; spire sub-acute, turreted, conical; whorls 7–8, flat, tabulate above, last one large, ovate-globose, sulcate next the suture, angular at the base; aperture oblique, narrow, oblong, contracted; peristome with a large sub-marginal external varix, rather thin, slightly expanded, angular above, then obliquely descending towards the base, where it is rounded and continuous with the labiate callosity on the columella and parietal region; inner margin labiate, with a median tubercle; columella with a transverse fold, a second one on the parietal region, and a tubercle above.

Length 4½ mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

This singular species, of which we obtained about fifty examples, was found lurking under stones a little below high-water mark, on the N. E. end of Tavinni Island.

PLECOTREMA CONSOBRINA, Garr., pl. 3, fig. 69.

Shell small, sub-perforate, ovate, solid, brownish with an obscure paler zone; spire convexly conical, about half the length of the shell, apex sub-acute; whorls 7, flatly convex, the last one large, rounded, deflected in front, transversely sulcate, sulci deep, the same width as the intervening ridges, which latter are slightly granulose, and about twenty in the body whorl; aperture small, oblong, contracted, oblique; peristome thick, externally varicose, labiate within, and furnished with two stout tubercular teeth on the middle of the lip; columella slightly expanded, with an oblique transverse compressed fold; parietal region glazed, bidentate, the lower tooth bifurcate.

Length 3 mill.

Hab. Viti Isles. (Coll. Phil. Acad Nat. Sciences.)

Not uncommon under stones at high-water mark. In color it closely resembles *P. mordax*, Dohrn., but is not so robust as that species. It is more closely allied to *P. hirsuta*, Nobis, but is less than half as large, differs in color, and is never hirsute like the latter.

PEDIPES SUBGLOBOSUS, Garr., pl. 3, fig. 70.

Shell imperforate, small, moderately thick, sub-globose, yellowish-horn color, transversely finely ridged; ridges about twice the width of their interstices, slightly scabrous with lines of growth; spire short, abbreviately conical; whorls 5, strongly convex, slightly angular, last one sub-globose, becoming angular above as it nears the peristome, base rounded; aperture oblique, oblong;. peristome sharp, finely crenulate, white, labiate within, armed with a stout sub-median tubercle, and a sinus above; columella white, vertical, flattened, with two transverse white compressed folds the upper the larger; parietal region thinly glazed and furnished with a large transverse compressed white fold.

Diam., greatest 4½, height 3 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

Only eight specimens were found. They were obtained from

under stones in the upper region of the littoral zone, at the island of Tanthala.

NANINA KIVAENSIS, Garr., pl. 8, fig. 71.

Shell small, imperforate, depressly globose, thin, pellucid, smooth, glossy, yellowish corneous; spire rounded, apex obtuse; suture margined; whorls 5, flatly convex, slowly and regularly increasing, last one rounded, not descending in front, base convex; aperture oblique, luniform; peristome thin, simple, columella white, callous, and furnished with a prominent twisted fold.

Diam., greatest 4, height 5 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A rare species found among decayed vegetation in the mountain forests of Kiva Isl. Its most obvious character is its dome-like spire and strong columella fold.

HELIX (TROCHOMORPHA) MERZIANOIDES, Garr., pl. 8, fig. 72.

Shell umbilicate, sub-lenticular, rather thin, sub-translucent, glossy beneath, chestnut-brown, mottled with radiating dashes of corneous, beneath honey-yellow becoming brown towards the margin; spire obtuse, convex; whorls 6, slightly convex, obliquely striated, regularly and slowly increasing, last one not descending in front, acutely carinate on the periphery, keel whitish; base convex; suture slightly margined; umbilicus moderate, perspective, freely exposing the whorls, about one-fifth the greatest diameter of the shell; aperture diagonal, sub-rhomboid luniform; peristome acute above, and slightly thickened towards the base.

Diam., greatest 22, height 9 mill.

Hab. Viti Isles. (Coll. Phil. Acad. Nat. Sciences.)

A rare species peculiar to the island of Vanua Levu, where it lives on the trunks of trees in damp forests. It is very closely allied to *H. Merziana*, Pfr., inhabiting the Solomon Islands. That species has the outer lip sinuous, more thickened and slightly declivous above. It is also banded on the lower surface, and the termination of the body whorl is somewhat dilated. Above, the color and markings are quite similar in the two species.

DESCRIPTION OF A NEW VARIETY OF BUTEO.

BY BERNARD A. HOOPES.

BUTEO BOREALIS, *Variety* KRIDERII. Pl. 5.

Male.—Bill strong, wide at the base, much curved, blue, darker towards the tip, edges of the upper mandible lobed. Cere blue and large. Nostrils large and roundish. Entire head and nape pure white, with the exception of a few feathers on each side of the forehead at the base of the upper mandible, which are tipped with dark-brown. Lores white, covered with bristly hairs, a faint superciliary line of an ochreous tint extends beyond the eyes.

Cheeks white, with several lines of feathers, narrowly tipped with dark-brown, extending down the sides of the neck and a short distance under the wings. Back brown, largely spotted with white, which is the prevailing color of the base of the feathers, some of them are edged with yellowish-brown; many of the feathers on the upper part of the back are arrow-shaped, or pointed, faintly edged with white.

Wings long and wide, of the prevailing color of the back, with lighter tints on the shoulders; the white of the under side of the wings extending over the edges.

Primaries dark, first quill shortest, third, fourth, and fifth nearly of a size (fourth rather the longest), of an ashy tint on the outer edges, the inner quills white, transversely barred with brown. Secondaries darker, similarly marked. Rump the same color as the back, feathers edged with rufous and white. Upper tail-coverts white.

Tail white, with an ochreous tint, darker towards the ends of the two middle feathers, banded with eleven irregular transverse bars of brown, the feathers rounded, or slightly pointed and tipped with white.

Throat, breast, and entire under parts pure white, inside of wings the same, first five quills edged with bluish-ash, inner webs largely white and strongly sinuated. A few sagittate spots of brown appear on the flanks and abdomen; tibial feathers long, having a very faint yellowish tinge. Under tail-coverts white, almost imperceptibly barred with faint lines, inside of tail-feathers white, the bars on the outside faintly showing through. Tarsus

ead-color, feathered in front about half way below the joint, protected beneath by ten large transverse scales. Toes dark lead-color, large. Claws black, and strong.

The female does not differ much from the male in the general appearance of the plumage, is considerably larger, as usual with the birds of prey. The back is rather lighter brown, the white spots larger.

Tail darker, more of an umber tint on the middle feathers, which are edged and tipped with white. The forehead is white, but the feathers of the head and neck are tipped with small lanceolate spots of brown. Under parts entirely white, with fewer spots on the flanks than the male, the tarsi and feet more robust, and of a similar color.

Dimensions.—Male, total length 20½ inches, tail 9 inches. Female, total length 22½ inches, tail 9½ inches.

The above description is made from two specimens, male and female, collected in Winnebago County, Iowa, by Mr. John Krider of Philadelphia, in September, 1872, and carefully prepared by that gentleman.

He mentioned having seen several others, and described them as having the habits and manner of flight common to the buzzard family, and, from their being noticed in the autumn, were possibly migrating from more northern breeding-grounds. During a previous visit to the same locality, in 1871, he saw a specimen evidently similar to these, but was unable to secure it. Being informed by residents of the country that the appearance of a "white hawk" there was not an unusual occurrence, he felt confident of ultimately procuring one, and has not been disappointed.

Being convinced that it is undescribed, I have named it in honor of the veteran naturalist to whom we are indebted for the discovery.

Spec. in Mus. Acad. Nat. Sciences, Philadelphia.

ON THE LINGUAL DENTITION AND JAW OF CERTAIN TERRESTRIAL PULMONATA FROM THE UNITED STATES, WITH REMARKS ON THEIR SYSTEMATIC VALUE.

BY THOMAS BLAND AND W. G. BINNEY.

The character of the jaw and lingual dentition of the various genera and subgenera of our land shells is now so well known, and apparently so constant, that we have not thought it necessary to give full descriptions in each case. We simply refer to a published description or figure under each genus or subgenus, unless some unusual feature has been observed. The number of ribs upon the jaw is given approximately when there is a difficulty in deciding whether certain stages of thickening of the material of the jaw shall be counted as rudimentary ribs or not.

MACROCYCLIS DURANTI, Newcomb.

Los Angeles, California, Mr. Henry Hemphill.

On examining the lingual membrane, we find it does not agree with that of *Hyalina* or *Zonites*, but with that of *Macrocyclis Vancouverensis*, *sportella* and *concava*. The species must therefore be recognized as a *Macrocyclis*.

The jaw was injured in extraction and imperfectly examined. It seems, however, to have the usual characteristics of the genus.

LIMAX CAMPESTRIS, Binney.

New Jersey, W. G. Binney.

Jaw and lingual membrane as usual in the genus.

ZONITES LIMATULUS, Ward.

Near Cincinnati, Ohio. Mr. A. G. Wetherby.

The species has the longitudinal furrows along the side, above the foot, and the caudal mucus slit, as in *Zonites suppressus*, (see our fig. 524 on p. 292 of Land and Fresh-water Shells of N. A., I.) In two individuals examined we found the sac and dart as figured by Leidy in *Z. ligerus* (Terr. Moll., I, pl. xii. fig. 3).

Jaw and lingual membrane as usual in the genus.

VITRINA PFEIFFERI, Newcomb.

Lake Tahoe, California, Dr. J. G. Cooper.

Jaw and lingual membrane as usual in the genus (see our fig. 21, 22, on p. 26, l. c.). About ten lateral teeth. Marginals bluntly bifid as usual.

VITRINA EXILIS, Morel.

Petropaulouski, W. H. Dall. The species is also found in Alaska.

Jaw and lingual membrane as usual in the genus, the former with ends somewhat recurved as in our figure of *Zonites arboreus* (l. c. p. 33). About seven lateral teeth.

HELIX MOOREANA, W. G. Binney. (*Polygyra.*)

Bosque County, Texas. Mr. Hugo W. Ericsson.

Jaw[1] with about fifteen, adjoining, broad ribs, denticulating either margin.

Lingual membrane as in *Polygyra.*[1]

HELIX HAZARDI, Bland. (*Polygyra.*)

Munroe Co., Tennessee, Miss Annie E. Law.

Jaw as usual in *Polygyra*, ribs adjoining, stout, denticulating either margin.

Lingual membrane as in *H. auriculata* (see our fig. l. c.).

HELIX AURIFORMIS, Bland. (*Polygyra.*)

Savannah, Georgia.

Jaw with ribs as usual in the subgenus—see last species.

Lingual membrane as usual in the subgenus. (See *H. Mooreana*, above.)

HELIX HIRSUTA, Say. (*Stenotrema.*)

New Jersey, T. Bland.

Jaw as usual in the subgenus.[2] Lingual membrane already described by us. (l. c. p. 119, fig. 197.)

HELIX SPINOSA, Lea. (*Stenotrema.*)

Philadelphia, Munroe Co., Tenn. Miss Annie E. Law.

Jaw as usual in *Stenotrema.*[2]

Lingual membrane as usual in the subgenus.[2]

HELIX RUGELI, Shuttleworth. (*Triodopsis.*)

Philadelphia, Munroe Co., Tenn. Miss Annie E. Law.

[1] See our figures l. c. p. 87 and 92.

[2] The jaw in *Stenotrema* is arcuate, ends blunt, anterior surface with crowded, broad ribs, denticulating either margin. See our figure of the jaw of *H. monodon*, l. c. p. 122, fig. 204. For lingual membrane, see fig. 205.

Jaw with about ten ribs; as usual in the subgenus.[1]

Lingual dentition as usual.[1]

HELIX FALLAX, Say. (*Triodopsis.*)

Philadelphia, Munroe Co., Tenn. Miss Annie E. Law.

Lingual membrane and jaw as usual in *Triodopsis*,[1] the latter with about fourteen ribs.

HELIX TRIDENTATA, Say. (*Triodopsis.*)

Same locality as last.

Jaw as usual in the subgenus.[1]

Lingual membrane already figured by us. (l. c. fig. 220, p. 130.)

HELIX HOPETONENSIS, Shuttleworth. (*Triodopsis.*)

Charleston, S. C. Mr. W. G. Mazyck.

Jaw with over ten ribs; as usual in the subgenus.[1]

Lingual membrane as usual.

HELIX DENTIFERA, Binney. (*Mesodon.*)

Mohawk, New York. Dr. James Lewis.

Jaw with fourteen ribs; as usual in the subgenus.[2]

Lingual membrane as usual.[2] The marginal teeth remind us of those of *Helix thyroides* (l. c. p. 148, fig. 252), but the inner denticle is more obtusely pointed. The figure referred to is liable to mislead. The marginals are subquadrate (not aculeate), with one long, oblique, sharply pointed denticle, much more produced than usual in the genus.

HELIX ROËMERI, Pfr. (*Mesodon.*)

Bosque Co., Texas. Mr. Hugo W. Ericsson.

Animal externally as in *H. thyroides*, *dentifera*, etc.

Jaw and lingual membrane as usual in the subgenus,[2] the former with over seven ribs.

HELIX ELEVATA, Say. (*Mesodon.*)

Philadelphia, Munroe Co., Tenn. Miss Annie E. Law.

[1] In *Triodopsis* the jaw is arcuate, ends blunt, anterior surface with stout, adjoining ribs, which denticulate either margin. See our fig. 214, p. 127, l. c. For lingual dentition, see fig. 215.

[2] In *Mesodon* the jaw is arcuate, ends blunt; anterior surface with stout, separated ribs, denticulating either margin. See our fig. 231, on p. 137, l. c. The lingual dentition is figured on p. 138, fig. 232. The central and lateral teeth are obtuse, short, stout, with obsolete side denticles to the reflected cusps.

Lingual membrane and jaw as usual in the subgenus,[1] the latter with over twelve ribs.

HELIX GERMANA, Gould. (*Mesodon.*)

California, Mr. Henry Hemphill.

Jaw more resembling the type usual in the subgenus *Stenotrema* than *Mesodon*, the ribs, eleven in number, being broad and crowded.

Lingual membrane as usual in *Helix*.

There are forms of *H. germana* closely connecting the species with *H. Columbiana*, Lea. The jaw of the latter is described by Dr. Cooper as strongly arched, with eight broad ribs.

HELIX GRISEOLA, Pfr. (*Fruticicola.*)

Bosque Co., Texas. Mr. Hugo W. Ericsson.

Jaw with about ten broad, crowded ribs, denticulating the cutting margin; upper margin with membranous attachment. The jaw is somewhat of the type figured by Moquin Tandon for that of *Helix hispida*. (See our fig. 274, p. 159, l. c.)

Lingual membrane as usual in the genus *Helix*. The reflected cusps of the teeth are short, stout. Marginals with blunt denticulations.

HELIX SEQUOICOLA, J. G. Cooper. (*Arionta.*)

Jaw as usual in the subgenus.[2] Ribs from four to six.

Lingual membrane as usual in the subgenus. Central and lateral teeth with short, stout cusps. Marginals with two bluntly bifid denticles.

HELIX EXARATA, Pfr. (*Arionta.*)

Santa Cruz, California, Mr. Henry Hemphill.

Lingual membrane and jaw as usual in the subgenus,[2] the latter with six ribs.

HELIX TRASKI, Newcomb. (*Arionta.*)

Los Angeles, California, Mr. Henry Hemphill.

Lingual membrane and jaw as usual in the subgenus,[2] the latter with eight ribs, five stout, three slight.

[1] See note 1 to p. 242.

[2] In *Arionta* the jaw is strongly arched, ends blunt; anterior surface with a few, stout, distant ribs, projecting far beyond, and deeply scalloping either margin. See our figure of that of *H. redimita* in Am. Journ. of Conch. VI. pl. ix. fig. 11. For lingual dentition, see our fig. 284, p. 164, of Land and Fresh-water Shells of N. A., I.

HELIX AYRESIANA, Newcomb. (*Arionta.*)

San Miguel Island, California. Mr. Henry Harford.

Animal long and slender, smoky-white, covered with white coarse granulations running longitudinally down the back, one line of granulations very prominent and central, bordered on either side with a deep furrow. Also oblique lines of granulations running down the sides of the foot. Foot dirty-white below. Tail short, broad, pointed. Some individuals are darker, with a purplish tinge.

Jaw and lingual membrane as usual in the subgenus,[1] the former with six ribs.

HELIX RUFICINCTA, Newcomb. (*Arionta.*)

Catalina Island, California. Mr. Henry Hemphill.

Jaw more like the type common in *Mesodon* than in *Arionta*, *i. e.*, arcuate rather than arched, margins rather pectinated than scalloped by the ends of the ribs, which are about ten in number.

Lingual membrane as usual in the subgenus.[1]

HELIX KELLETTI, Forbes. (*Arionta.*)

Catalina Island, California. Mr. Henry Hemphill.

Jaw and lingual membrane as usual in the subgenus,[1] the former with about six ribs.

HELIX NEWBERRYANA, W. G. Binney. (*Glyptostoma.*) See our plate I., fig. 12, 3.

San Diego, California. Mr. Henry Hemphill.

This species belongs to no described section or subgenus, we propose for it, therefore, the name *Glyptostoma*, (γλυπτος, στωμα), from the peculiar sculptured lines which revolve upon the parietal wall.

GLYPTOSTOMA, subgen. nov.

Testa late umbilicata, depressa, ruguloso-striata, solida, anfractus 6, ultimus depresso-globosus, antice non descendens; apertura obliqua, subcircularis; peristoma simplex, acutum, intus incrassatum, marginibus approximatis, columellari brevi, vix reflexiusculo.

Maxilla arcuata, costis validis distantibus (circa 16) exarata; margines valde dentati.[2]

Lamina lingualis ut in Helice videtur; dentes marginales subquadrati.

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[1] See note 2 to p. 243.

[2] See our plate I., fig. 1, and the explanation of the plate.

Systema sexuale simplex;[1] desunt sagitta, bursa, flagellum, et vesica multifida. Orificium ut in *Helice* positum.

Externally, the animal resembles that of *Helix*. It is bluish-slate colored.

We have already described and figured the lingual dentition (see Am. Journ. Conch., VII. 190, pl. xvii. fig. 3, 4). The jaw is long, low, slightly arcuate; ends blunt; anterior surface with about sixteen stout, separated ribs, scalloping either margin. The jaw is lower, less arcuate and longer than in *Arionta*. Its ribs resemble those of that subgenus in projecting far beyond and scalloping the margins of the jaw, but they are much more numerous.

This description applies only to the more perfect form of the jaw (fig. 1 of our plate), noticed only in one individual. In several other individuals the ribs on the jaw were much more narrow and less projecting at the upper and lower margins. There is more difference between these than is usually found in different individuals of the same species.

SUCCINEA CAMPESTRIS, Say.

Charleston, S. C. Mr. W. G. Mazyck.

Jaw as usual in the genus; the anterior surface has no decided ribs.

Lingual membrane as usual in the genus (see our figure on p. 267, l. c.).

SUCCINEA LINEATA, W. G. Binn.

Little Colorado River, Arizona. Dr. E. Palmer.

Jaw and lingual membrane as usual in the genus, the former without distinct anterior ribs.

Having published many descriptions and figures of the jaws and lingual dentition of mollusks, mostly terrestrial, we here propose to review our work, to see how nearly our observations agree with the generic descriptions published by Albers and von Martens for the various genera. We give below a list of our descriptions published previous to 1873 in other works than the Land and Fresh-water Shells of North America, Parts I. II. and

[1] See our plate, fig. 3. There is one accessary organ, of use unknown to us. See below, explanation of plate.

III., and the second edition of the Invertebrata of Massachusetts. In cases where we have not published together, the name of the separate author is given.

PULMONATA GEOPHILA.

(*a.*) *Without jaw.*

Gonospira sulcata, Müller. Ann. Lyc. N. H. of N. Y., X. 222. See next species.

Gonospira palanga, Fér. Am. Journ. Conch., V. 37, pl. xi. fig. 1, photograph.

Lingual membrane quite distinct from *Pupa*, in which it is placed by von Martens.

Glandina rosea, Fér. Am. Journ. Conch., VI. 202, fig. 1.

(*b.*) *With jaw in one single piece.*

?Hyalina Baudoni, Petit. (*Mörchia.*) Am. Journ. Conch., VII. 175.

There are no lateral teeth as usual in *Hyalina*. The lingual is like that of *Macrocyclis*, to which genus we believe it belongs.

Macrocyclis Voyana, Newc. Am. Journ. of Conch., VII. 175.

We have shown the dentition to be peculiar in this genus.

Stenopus Guildingi, Bland. Ann. Lyc. N. H. of N. Y., VIII. 158, fig. 3. T. Bland.

Nanina Calias, Benson. Am. Journ. Conch., VII. 188, pl. xvii. fig. 6, 8.

Lingual membrane not given in Albers' ed. 2. We have shown that it differs from Troschel's figures.

Nanina cultrata, Gould. Am. Journ. Conch., VII. 189.

Nanina inversicolor, Fer., **leucostyla**, Pfr., **rufizonata**, H. Ad., **militaris**, Pfr. Ann. Lyc. N. H. of N. Y., X. 169.

All shown by us not to belong to the genus *Helix*.

Limax flavus, Lin. Copied in Am. Naturalist, IV. 167, fig. 42, 43. W. G. B.—Ann. Lyc. N. H. of N. Y., IX. 285, fig. 6.

Limax maximus, Lin. Am. Journ. Conch., VI. 203.

Zonites capsella, Gould. Am. Journ. Conch., VII. 174.

Zonites ligerus, Say. Am. Journ. Conch., VII. 174.

Zonites gularis, Say. Am. Journ. Conch., VII. 174.

Zonites intertextus, Say. Pr. Phila. Ac. N. Sc., 1872, 135.

Zonites demissus, Binney. Proc. Phila. Ac. N. Sc., 1872, 135.

Zonites lasmodon, Phillips. Proc. Phila. Ac. N. Sc., 1872, 135.

Zonites internus, Say. Proc. Phila. Ac. N. Sc., 1872, 135.

Zonites lævigatus, Pfr. Ann. Lyc. N. H. of N. Y., IX. 284, fig. 4.—Proc. Ac. N. Sc. Phila., 1872, 135.

Pallifera dorsalis, Binney. Proc. Phila. Ac. N. Sc., 1872, 137.

Hemphillia glandulosa, Ann. Lyc. N. H. of N. Y., X. pl. ix. fig. 15, 16, 17.

Ariolimax Columbianus, Gould. Am. Journ. Conch., I. 48, pl. vi. fig. 12, 13. W. G. B.

Veronicella Floridana, Binney. Ann. Lyc. N. H. of N. Y., IX. 285, fig. 5.

Veronicella. Am. Journ. Conch., VII. 163, pl. xii. fig. 7.

Bulimus oblongus, Müll. (*Borus.*) Am. Journ. Conch., VII. 180.

Bulimus pardalis, Fer. (*Dryptus.*) Am. Journ. Conch., VII. 181.

Bulimus marmoratus, Dunker. (*Dryptus.*) Am. Journ. Conch., VII. 181.

Jaw not examined.

Bulimus multicolor, Rang. (*Anthinus.*) Am. Jour. Conch., VI. 208.

The jaw is ribless, thus differing from description of *Bulimus.*

Bulimus Hanleyi, Pfr. (*Orphnus.*) Am. Journ. Conch., VI. 208.

Jaw quite unlike generic description. Strongly arched, with a median projection, ribless.

Bulimus magnificus, Grat. (*Orphnus.*) Am. Journ. Conch., VI. 208.

Jaw quite like generic description.

Bulimus odontostomus, Sowb. (*Macrodontes.*) Am. Journ. Conch., VI. 209.

The jaw differs from the generic description in being ribless.

Bulimus aulacostylus, Pfr. (*Eurytus.*) Ann. Lyc. N. H. of N. Y., X. 222.

The jaw as in *Bulimulus.*

Bulimus auris-Sileni, Born. (*Pelecychilus.*) Same as last species.

Cochlostyla fulgetrum, Brod. Am. Journ. Conch., VII. 180.

Jaw not described in Albers and v. Martens. We find it with ribs.

Limicolaria Numidica, Reeve. Am. Journ. Conch., VII. 181.

Jaw differs from the generic description in being ribless.

Eucalodium Newcombianum, Gabb (= **Berendtia Taylori**, Pfr.). Ann. Lyc. N. H. of N. Y., VIII. 175, fig. 3. T. Bland.

Stenogyra decollata, Lin. Am. Journ. Conch., VII. 183.

Stenogyra gonostoma, Gundl. Am. Journ. Conch., VII. 183.

Stenogyra octona, Chemn. Am. Journ. Conch., VII. 183.

We have shown the peculiar characters of the dentition constant in the three species.

Clausilia tridens, Chemn. Am. Journ. Conch., VII. 28, pl. ii. fig. 1–5, 7, 8.

Amphibulima patula, Brug. Am. Journ. Conch., VII. 186, pl. xvii. fig. 1, 2, lingual membrane. Jaw in Ann. Lyc. N. H. of N. Y., X. 225, pl. xi., fig. 8.

We have shown the jaw and dentition to be unlike *Succinea.*

Pellicula? appendiculata, Pfr. Ann. Lyc. N. H. of N. Y., X. 206, pl. ix. fig. 2, 9–11.

Bulimulus pallidior, Sowb. Ann. Lyc. N. H. of N. Y., IX. 283, fig. 2, lingual.

Bulimulus laticinctus, Guppy. Ann. Lyc. N. H. of N. Y., X. 81, pl. ii. fig. 1, 5.

The teeth are peculiarly modified.

Bulimulus Bahamensis, Pfr. Ann. Lyc. N. H. of N. Y., X. 82, pl. ii. fig. 3, 4.

The teeth are peculiarly modified.

Bulimulus sufflatus, Gould. Am. Journ. Conch., VI. 209, pl. ix. fig. 8, 13.

Bulimulus Marielinus, Poey. Am. Journ. Conch., VI. 209. Jaw alone.

Bulimulus Jonasi, Pfr. Am. Journ. Conch., VII. 182, as in *B. aureolus*.

Bulimulus aureolus, Guppy. Am. Journ. Conch., VII. 181.

Lingual membrane as in *B. laticinctus*. Jaw not examined.

Bulimulus alternatus, Say. Am. Journ. Conch., VII. 181.

Bulimulus membranaceus, Phil. Am. Journ. Conch., VII. 182.

Teeth as in *B. laticinctus*.

Bulimulus dealbatus, Say. Am. Journ. Conch., VII. 182. Jaw only.

Bulimulus Berendti, Pfr. Am. Journ. Conch., VII. 182.

The species referred to proves to be *B. corneus*, Sow.

Bulimulus durus, Spix. Am. Journ. Conch., VII. 182.

Cylindrella subula, Fér. Am. Journ. Conch., VII. 183.

Cylindrella seminuda, Ad. Am. Journ. Conch., VII. 184.

Cylindrella rosea, Ad. Am. Journ. Conch., V. 37, pl. xi. fig. 2, photograph.

Cylindrella scæva, Gundl. Ann. Lyc. N. H. of N. Y., VIII. 161, fig. 4. Lingual membrane only. Ibid. IX. 77. T. Bland.

Cylindrella Blandiana, Pfr. Ann. Lyc. N. H. of N. Y., IX. 85, fig. 5. T. Bland.

Cylindrella trinitaria, Pfr. Am. Journ. Conch., IV. 187, fig. T. Bland.

Jaw first noticed, also jaw described in *C. rosea*, *sanguinea*, *brevis*, *Maugeri*, *gracilis*, *elongata*, *Bahamensis*, *scæva*, *Elliotti*, *Brooksiana*.

Macroceramus Gossei, Pfr. Am. Journ. Conch., VII. 187, pl. xvii. fig. 9, 11, 12.

Teeth quite different from the form usual in *Cylindrella* and *Macroceramus*.

Macroceramus signatus, Guild. Ann. Lyc. N. H. of N. Y., VIII. 162, fig. 5, 6. Ibid. IX. 84. T. Bland.

Pineria Viequensis, Pfr. Ann. Lyc. N. H. of N. Y., X. 26.

Lingual membrane entirely distinct from *Pupa*, where it is placed by von Martens.

Patula strigosa, Gould. Proc. Phila. Ac. N. Sc., 1872, 135.

Patula Idahoensis, Newc. Same as last, 136.

Patula Cooperi, W. G. Binn. Same as last, 136.

Patula perspectiva, Say. Same as last, 136.

Patula solitaria, Say. Am. Journ. Conch., VII. 176.

Patula Hemphilli, Newcomb. Am. Journ. Conch., VI. 207, pl. ix. fig. 3.

Patula Cooperi, W. G. Binn. Am. Journ. Conch., VI. 207. Jaw.

Sagda connectens. Ad. Am. Journ. Conch., VII. 175.

The marginal teeth are quadrate, not aculeate, proving the genus to belong to the *Helicea*, not to the *Vitrinea*.

Sagda Haldemaniana, Adams. Am. Journ. Conch., VII. 175. See last species.

Sagda Jayana, Adams. Ann. Lyc. N. H. of N. Y., X. 219. See last species.

Helix circumfirmata, Redf. (*Microphysa.*) Ann. Lyc. N. H. of N. Y., X. 221.

The species shown to belong to the *Vitrininæ*.

Helix turbiniformis, Pfr. (*Microphysa.*) Ann. Lyc. N. H. of N. Y., X. 79, pl. ii. fig. 2.

Jaw unusual in the genus—resembling that of *Bulimulus*.

Helix Boissieri, Charp. (*Leucochroa.*) Ann. Lyc. N. H. of N. Y., X. 220.

The species shown to be more nearly related to *Helix* than to any of the *Vitrininæ*.

Helix Yatesii, J. G. Cooper. (*Gonostoma.*) Am. Journ. Conch., VII. 176.

Helix polygyrella, Bland and Cooper. (*Polygyrella.*) Proc. Phila. Ac. N. Sc., 1872, 136.

Helix microdonta, Desh. (*Polygyra.*) Am. Journ. Conch., VI. 205.

Helix septemvolva, Say. (*Polygyra.*) Am. Journ. Conch., VI. 206.

Helix fastigans, L. W. Say. (*Polygyra.*) Am. Journ. Conch., VII. 176.

Helix stenotrema, Fer. (*Stenotrema.*) Am. Journ. Conch., VI. 207.

Helix loricata, Gould. (*Triodopsis.*) Am. Journ. Conch., VI. 206.

Helix inflecta, Say. (*Triodopsis.*) Am. Journ. Conch., VI. 206.

Helix palliata, Say. (*Mesodon.*) Proc. Phila. Ac. N. Sc., 1872, 136.

Helix obstricta, Say. (*Mesodon.*) Same as last, 136.

Helix devia, Gould. (*Mesodon.*) Proc. Phila. Ac. N. Sc., 1872, 136.

Helix similaris, Fér. (*Dorcasia.*) Am. Journ. Conch., VII. 176.

Helix Newberryana, W. G. B. Am. Journ. Conch., VII. 190, pl. xvii. fig. 3, 4.

Helix fidelis, Gray. (*Aglaja.*) Am. Journ. Conch., VI. 207, pl. ix. fig. 1, 9.

Jaw said to be ribless, but a better specimen found normal, Proc. Phila. Ac. N. Sc., 1872, 136.

Helix redimita, W. G. Binn. (*Arionta.*) Am. Journ. Conch., VI. 206, pl. ix. fig. 11.

Helix tudiculata, Binney. (*Arionta.*) Am. Journ. Conch., VI. 208, pl. ix. fig. 7.

Helix Townsendiana, Lea. (*Arionta.*) Am. Journ. Conch., VI. 206.

Helix reticulata, Pfr. (*Arionta.*) Am. Journ. Conch., VII. 177.

Helix Nickliniana, Pfr. (*Arionta.*) Am. Journ. Conch., VII. 177.

Helix Tryoni, Newc. (*Euparypha*) jaw, W. G. B. Am. Journ. Conch., I. 93, pl. vi. fig. 2-10.

Showing variation in number of ribs.

Helix Gossei, Ad. (*Coryda.*) Am. Journ. Conch., VII. 177. Lingual membrane only.

Helix aspera, Fer. (*Thelidomus.*) Am. Journ. Conch., VI. 204.

Helix notabilis, Shuttl. (*Thelidomus.*) Am. Journ. Conch., VII. 177. Lingual membrane only.

Helix pemphigodes, Pfr. (*Cysticopsis.*) Am. Journ. Conch., VII. 177. Lingual membrane only.

Helix tumida, Pfr. (*Cysticopsis.*) Ann. Lyc. N. H. of N. Y., IX. 283, fig. 3, lingual.

Jaw, different from generic description, figured in Am. Journ. Conch., VI. 203, fig. 2.

Helix loxodon, Pfr. (*Plagioptycha.*) Am. Journ. Conch., VII. 177.

Unlike the generic description, the jaw has a median projection, and is ribless.

Helix diaphana, Lam. (*Plagioptycha.*) Am. Journ. Conch., VII. 178. See last species.

Helix monodonta, Lea. (*Plagioptycha.*) Am. Journ. Conch., VII. 178. See last.

Helix Albersiana, Pfr. (*Plagioptycha.*) Amer. Journ. Conch., VII. 178. Jaw same as in last species.

Helix macroglossa, Pfr. (*Plagioptycha.*) Am. Journ. Conch., VII. 178. Jaw with median projection and no anterior ribs.

Helix varians, Mke. (*Polymita.*) Am. Journ. Conch., VI. 206, lingual.

Helix muscarum, Lam. (*Polymita.*) Am. Journ. Conch., VI. 204, pl. ix. fig. 4, 16.

Jaw ribless, lingual widely differing from the usual type of *Helix*.

Helix graminicola, Ad. (*Polymita.*) Amer. Journ. Conch., VII. 178. Jaw different from generic description of *Helix* in having no anterior ribs —and in having a median projection to its cutting edge.

Helix orispata, Pfr. (*Eurycratera.*) Am. Journ. Conch., VII. 179.

Helix orbiculata, Fér. (*Dentellaria.*) Am. Journ. Conch., VI. 205, pl. ix. fig. 14. Jaw apparently costate.

Helix Isabella, Pfr. (*Dentellaria.*) Am. Journ. Conch., VII. 179. Jaw surely costate.

Helix dentiens, Fér. (*Dentellaria.*) Am. Journ. Conch., VII. 179. Jaw as in last.

Helix perplexa, Fér. (*Dentellaria.*) Ann. Lyc. N. H. of N. Y., X. 221. Jaw with traces of anterior ribs, but with a median projection to its cutting edge.

Helix Schroeteriana, Pfr. (*Pleurodonta.*) Am. Journ. Conch., VII. 179.

Lingual membrane alone examined.

Helix acuta, Lam. (*Pleurodonta.*) Am. Journ. Conch., VI. 204.

Helix excellens, Pfr. (*Caracolus.*) Am. Journ. Conch., VII. 180. Lingual membrane only examined.

Helix Bermudensis, Pfr. (*Caracolus.*) Ann. Lyc. N. H. of N. Y., X. 221.

The species shown to belong to the *Vitrininæ*.

Helix fuscocincta, Ad. (*Leptoloma.*) Am. Journ. Conch., VII. 180. Jaw unlike generic description in having a median projection and no ribs.

Helix Phœnix, Pfr. (*Acavus.*) Am. Journ. Conch., VII. 180. Jaw with no anterior ribs.

(*c.*) *With jaw in separate pieces.*

Liguus virgineus, Lin. Am. Journ. Conch., VI. 209, fig. 3, 4, lingual membrane.

Liguus fasciatus, Müll. Am. Journ. Conch., VI. 211, pl. ix. fig. 6.

Orthalicus zebra, Müll. Am. Journ. Conch., VI. 212, pl. ix. fig. 2.

Orthalicus undatus, Brug. Am. Journ. Conch., VI. 213, pl. ix. fig. 10, 12.

(*d.*) *With jaw with supplementary upper plate.*

Succinea effusa, Shuttl. Am. Journ. Conch., VI. 213, pl. ix. fig. 15.

Succinea Nuttalliana, Lea. Ann. Lyc. N. H. of N. Y., IX. 282, fig. 1.

PULMONATA LIMNOPHILA.

Limnæa appressa, Say. Am. Journ. Conch., VII. 161, pl. xii. fig. 1, 2, 5.

Limnæa megasoma, Say. Am. Journ. Conch., VII. 162, pl. xii. fig. 3, 6.

Pompholyx effusa, Lea. Ann. Lyc. N. H. of N. Y., IX. 290, fig. 9.—Amer. Journ. Conch. VI. 312, pl. xviii.

Planorbis trivolvis, Say. Ann. Lyc. N. H. of N. Y., IX. 292, fig. 10.

Melampus bidentatus, Say. Ann. Lyc. N. H. of N. Y., IX. 286, fig. 7.

PECTINIBRANCHIATA.

Geomelania. Am. Journ. Conch., VII. 185, pl. xvii. fig. 7, 10.

Blandiella reclusa, Guppy. Am. Journ. Conch., VII. 185, pl. xvii. fig. 5.

Cyclotus stramineus, Rve. Am. Journ. Conch., I. 45, pl. v. fig. 1, 4. T. Bland. Jaw and teeth.

Megalomastoma cylindraceum, Chemn. Am. Journ. Conch., I. 45, pl. v. fig. 2, jaw. T. Bland.

Megalomastoma Antillarum, Sowb. Same as last, fig. 3, teeth. T. Bland.

Megalomastoma bituberculatum, Sowb. Am. Journ. Conch., VI. 213, fig. 6.

Tulotoma magnifica, Conrad. Ann. Lyc. N. H. of N. Y., IX. 293, fig. 11.

SCUTIBRANCHIATA.

Stoastoma pisum, Ad. Am. Journ. Conch., VII. 184.

Helicina occulta, Say. Ann. Lyc. N. H. of N. Y., IX. 287, fig. 8.—Am. Journ. Conch., VII. 29, pl. ii. fig. 6.

Helicina orbiculata, Say. Am. Journ. Conch., VI. 214, pl. ix. fig. 5.

From the observations we have catalogued above, it appears that the jaw cannot be depended upon as a generic character in the genus *Bulimus*, as constituted in the second edition of Die Heliceen. We have found it strongly ribbed, with ribs as described below in *Bulimulus*, ribless, and ribless with a decided median projection to its cutting edge. In *Limicolaria* the jaw is described with ribs, we find it ribless in one species. In *Bulimulus*, von Martens describes the jaw as composite. We have shown it to be in one single piece, though divided by delicate ribs into numerous plate-like sections. The jaw is also very thin and transparent. This form of jaw seems constant in *Bulimulus*. It is also found in *Cylindrella*, *Macroceramus*, *Amphibulima*, *Gæotis*, and even in *Helix* (*H. turbiniformis*). The tendency to an upper triangular median plate is more or less seen in this form of jaw—its greatest development being in *Cylindrella*.

In the genus Helix as constituted by von Martens, the jaw is said to be ribbed, but we have found every variety of jaw except that with an upper additional plate, and that with free imbricated plates as in *Orthalicus*. We believe, however, that the form of jaw is constant in all the species of each section or subgenus of

Helix. Thus we have found the jaw alike in all the species we have examined of *Patula*. So of *Sagda*, *Polygyra*, *Mesodon*, *Arionta*, *Stenotrema*, *Triodopsis*, *Plagioptycha*, *Polymita*, *Dentellaria*.

It appears to us, therefore, that we may hope to find a reliable generic character in the jaw, when the present subgenera, or some of them at least, are recognized as distinct genera. On account of the gradations in the ribs and median projection, we have elsewhere[1] suggested that for the purpose of grouping the genera into subfamilies, we may depend only upon the following distinctions in the jaw.

(*a*.) Jaw in one piece.

(*b*.) Jaw in separated, imbricated pieces.

(*c*.) Jaw in one piece with an upper accessory plate.

As regards the lingual dentition, it appears that the distinction, as far as the central and lateral teeth are concerned, is but slight between the various families and genera. The marginal teeth, however, give us two very distinct types, the aculeate and quadrate.

The former is found either unaccompanied by a jaw, or by its simplest form. Up to this date no instance is on record of aculeate marginal teeth together with a jaw complicated by anterior ribs, free imbricated plates, or an upper accessory plate. The presence of aculeate marginal teeth is usually (not always) indicated by a smooth, shining shell, with acute peristome. The shell, however, is not always reliable as an indicator of the form of marginal teeth, for we have shown the rough shells of several Mauritius species to have a lingual membrane with aculeate marginal teeth. It appears, therefore, that the shell alone will not indicate the generic position of some species.

The quadrate marginal teeth are accompanied by various forms of jaw. They are usually constant in shape in the various genera. Sometimes, however, we have met with unexpected variation—such as in *Macroceramus Gossei*, *Helix muscarum*, and a group of *Bulimulus* represented by *B. lalicinctus*.

The form of jaw with free, imbricated plates seems (excepting in *Punctum*) constantly accompanied by a peculiar form of quadrate teeth, as in *Orthalicus* and *Liguus*. To our surprise, however, we have detected a somewhat similar form of teeth in *Gæotis*,

[1] Ann. Lyc. N. H. of N. Y., X. 163.

whose jaw is like that of *Bulimulus*.[1] It seems, therefore, that the lingual dentition is less reliable as a generic character than the jaw, at least in cases where the aculeate marginal teeth are absent.

Finally, we are convinced that most satisfactory results will follow the patient investigation of the jaw and lingual dentition of the *Geophila*. Although we have in many cases proved the distinctions, which have been based on them, to be unreliable, we believe that a further accumulation of facts will lay the foundation of a natural and generally acceptable classification.

EXPLANATION OF PLATE I.

Fig. 1. The jaw of *Helix Newberryana* (see page 244).

Fig. 2. Genitalia of *Helix infumata*. See references to fig. 5, except 9, the duct of the genital bladder.

Fig. 3. Genitalia of *Helix Newberryana*. Same references as in 5, excepting 12, probably a rudimentary dart sac, for which see page 245. The names of the organs are the same as used by Dr. Leidy in the plates of Vol. I. of Dr. Binney's Terrestrial Air-breathing Mollusks of the United States.

We failed to detect any accessory gland of the epididymis. The epididymis is very long, convoluted in the lower half of its length, straight above. It runs free for a long distance outside the membrane which covers the oviduct, before entering into the liver, where it joins the testicle. The latter is imbedded in the liver, near its upper extremity. It is composed of several, apparently six, separated fasciculi of blind tubes. The vas deferens enters the penis about its middle, not at its end. The penis is small, cylindrical. There is no trace of lobuli in the ovary, but its under, concave surface is reticulated. The genital bladder is oval, its duct is long, free only for a short distance, then attached to the oviduct the whole length of the latter; at its base it becomes again free, and enters the vagina below the terminus of the oviduct. At about the same point, the vagina receives the mouth of a long, broad, rounded organ, (12 of fig. 3). This organ is hollow. Its use is unknown to us, it may be a dart sac, or a prostate gland.

[1] We are about publishing this in the Ann. N. Y. Lyc. of N. H., 1873, X. 251, pl. xi. fig. 5.

The vagina is very long, the penis enters it at its lower extremity near the exterior opening of the genitalia.

For the sake of comparison, we have also given figures of the genitalia of two other Pacific subgenera, *Arionta* and *Aglaja*. In *Helix Townsendiana*, Lea (*Arionta*), see plate I. fig. 4, we detected the accessory gland of the epididymis (3), composed of several acini of different sizes. The genital bladder is lengthened oval (9), and differs greatly from that of *Helix Newberryana* in having a very short, stout duct. At the opening of the penis there is a decided enlargement, perhaps of the nature of a prepuce, or prostate. The vas deferens enters the penis below its apex. The retractor muscle is at the apex of the penis. There seems no accessory organ, the genitalia being reduced to their simplest type.

Of *Aglaia* we have examined two species, *H. fidelis*, Gray, and *H. infumata*, Gould. The genitalia of these are almost exactly similar. In neither have we detected any accessory gland to the epididymis. In both the penis is extended into a decided flagellum (15). The vas deferens (7) enters below the flagellate extension (15). The retractor muscle (6) is attached on the opposite side and still lower down. There is a well-marked prepuce (12). Opposite the entrance of the penis on the other side of the vagina, which is here considerably swollen, is a small sac-like organ (14), ending in a smoothly rounded cul-de-sac, of what use in the economy of the animal is unknown to us, unless it be a rudimentary dart sac. There was no appearance, however, of a dart within it. Just above this organ opens the stout duct of another organ (13), cylindrical, bluntly pointed, hollow, of a reticulated appearance. There is a contraction where this organ joins its duct, which is of about the same size. The two together are about as long as the penis with its flagellum, and stouter. No dart was noticed within this organ. It is, no doubt, a form of vaginal prostate, as described by Moquin Tandon. The genital bladder (9) is globular. Its duct is long, free in the upper half of its course. The oviduct, ovary, genital bladder, testicle, etc., of *H. infumata*, fig. 2, are not figured by us. They are as in *H. fidelis*, fig. 5, excepting the testicle, which is as in *H. Newberryana*.

Fig. 4. Genitalia of *Helix Townsendiana*, Lea. Same reference as in Fig. 5, excepting 3, the accessory gland of the epididymis.

Fig. 5. Genitalia of *Helix fidelis*, Gray.

1. Testicle.
2. Epididymis.
4. The prostate gland.
5. The sac of the penis.
6. The retractor muscle of penis.
7. The vas deferens.
8. The oviduct.
9. The genital bladder.
10. The exterior orifice of genitalia.
11. The ovary.
12. The prepuce.
13. Vaginal prostate.
14. Rudimentary dart sac?
15. The flagellum, which contains a capreolus.
16. The duct of the genital bladder.

APRIL 1.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-nine members present.

The following paper was presented for publication:—
"On the Affinities of the Sirenians." By Theo. Gill.

Dr. LEIDY presented an interesting specimen of bituminous coal from the mines of the Westmoreland Coal Company, Westmoreland County, Pennsylvania. This specimen is a gift to the museum, from George C. Hewett, Esq., Mining Engineer, who furnishes the following details: The seam from which the specimen is taken is noted for its regularity and freedom from faults. Occasional cracks, however, occur sometimes several hundred feet in length. In these cracks incrustations of iron pyrites are found in various forms, of which an unusual one is shown in the present specimen, viz., in the form of stalactical prolongations. The remaining portions of the vein consist of remarkably pure coal especially suited for the manufacture of illuminating gas.

Prof. LEIDY remarked that the rat presented this evening by Mr. L. Fussel was a specimen of the Black Rat, or Mus rattus, which had been caught on board a ship in the vicinity of the city. This rat is exceedingly rare, but is said to have once been common enough, and is also said to have been nearly exterminated by the common brown or Norway Rat.

Prof. Leidy also exhibited a specimen of iron ore, recently sent to him by Dr. George W. Lawrence, of Hot Springs, Ark. It was the mineral Dufreynite, and was found in Polk Co., Ark.

APRIL 8.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-eight members present.

Dr. LECONTE announced the death, at Davidsburg, York Co., Pa., on the 10th March, of Friedrich Ernest Melsheimer, M.D., a correspondent of the Academy, aged nearly ninety-one years. He inherited great taste for entomology from his father, E. F. Melsheimer, a clergyman, who cultivated natural science with much success, and not only was a highly esteemed correspondent of Knoch and other European entomologists of the end of the past and beginning of the present century, but an active collaborator

with Say, the founder of descriptive entomology in the United States.

Dr. Melsheimer thus inheriting the tastes and the collection of his father, has preserved, for later investigators, the only authentic types of many of Mr. Say's species; and has also contributed no small proportion of the descriptions of Coleoptera, which appeared up to February, 1847. His memoirs on this subject, containing notes and descriptions of about four hundred and fifty-seven species, were printed in the 2d and 3d vols. of the proceedings of this Academy.

Entomology also owes to him the catalogue of the described Coleoptera of the United States, which, after revision by Prof. S. S. Haldeman and myself, was published by the Smithsonian Institution in 1853. It was the first work of bibliographical importance in the modern history of that branch of science, and gave a powerful impetus to its development in the United States, and has greatly diminished the labor of those who have continued the study of that department.

Living an isolated life on his farm, remote from usual lines of travel, dependent almost entirely on letters for the sympathy and counsel of his fellow students, separated from libraries containing the results of modern research, and therefore dependent on the traditional knowledge received from Europe, which constituted in fact most of the intellectual capital of the founders of natural history in the United States, Dr. Melsheimer must be considered as a very remarkable instance of one who, with very limited opportunities, has worked honestly, to the extent of his abilities, to develop the powers of usefulness which were given him.

Modest, unpretending, affectionate to his family, devoted to his friends, industrious to the limit of human usefulness, his death, at such an advanced age, can only leave, with those who have enjoyed his acquaintance, a satisfaction that they have known so good a representative of the purer qualities of humanity.

The following letter, on the introduction of the California Salmon, was read by Prof. Cope:—

HARRISBURG, Pa., March 11, 1873.

MY DEAR SIR: Supposing you might feel some interest in the matter, I propose to give you a short account of the introduction of the California Salmon, which I hope it will be my good fortune to be able years hence to say I effected on the third of this present month.

Professor Baird, U. S. Com. of Fisheries, employed last summer Mr. Livingston Stone, of Rhode Island, to procure the spawn of some California Salmon. They have been called Sacramento Salmon; and I believe the spawn were obtained from that stream or one of its branches.

Dr. Slack obtained just sixty-nine hundred young; they thrived

and got on very well in his preserves till about the 18th of February, when he found that they could not be preserved in the small space at his disposal for them and they began to die from confinement.

I had previously arranged with Mr. Baird that these fish should be deposited in the Susquehanna—a gift from the Government to Pennsylvania—so Dr. Slack said I must get ready as soon as possible, as he feared the mortality amongst them might spread. The weather was so warm that we could not move them until the 3d inst. as stated—by which time the loss had reached to one hundred and fifty individuals. They were transported across from New Jersey, about seven miles from Easton, to Harrisburg on the day named, and I had them placed in the water in an air hole in the ice close to the shore at Harrisburg—about one hundred died on the passage—about fifty were much weakened by the journey but recovered in a few minutes after reaching the new water. But the balance, the healthy ones, immediately made for the current, and disappeared under the ice with as much energy as if they were native to our Susquehanna.

The water, when they entered, was 36° Fahr. at the time, but the river bottom is full of springs at which they could warm themselves. Had I the least idea that there was no description of them, I should have noted their peculiarities in my unscientific way more particularly, but as it is the above is the best description I can give you of them. Dr. Slack, I believe, fed them after they had parted with their yolk sack; but I concluded, from my own judgment, that the best thing I could do was to trust them to the magnificent Susquehanna. The energy with which the healthy ones put out leads me to hope that they will live if not devoured by enemies; but should they die we can repeat the experiment with a larger quantity hereafter.

Your obedient servant,

JAMES WORRALL.

Prof. E. D. COPE,
Philadelphia.

APRIL 15.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

The following paper was presented for publication:—

"Observations on a change of Structure of a Larva of Dryocampa Imperialis." By THOS. G. GENTRY.

Remarks on Extinct Mammals from California.—Prof. LEIDY directed attention to some fossils, which he had borrowed, through

Prof. E. O. Hovey, from the cabinet of Wabash College, Crawfordsville, Indiana. They were part of a collection obtained by Dr. Lorenzo G. Yates from a quarternary deposit of California. One of the specimens is the right ramus of the lower jaw of a wolf, probably of the Canis indianensis, previously indicated from a specimen found on the banks of the Ohio, Indiana.

A second specimen consists of the fore part of a maxillary bone, with the second prenular, and the canine alveolus, of a tiger as large as the largest living Bengal tiger. It probably indicates a species different from those previously noticed, and might be named FELIS IMPERIALIS.

Several specimens consist of upper molar teeth, which ar esupposed to pertain to Bison latifrons.

The remaining and most interesting specimens consist of an upper molar and a complete lower molar series of a lama as large as the existing camel. Remains of a still larger species from California have been previously indicated under the name of Auchenia californica. The present specimens were referred to a species with the name AUCHENIA HESTERNA. Prof. Owen has described some remains of an equally large lama from Mexico, which he refers to an allied genus with the name of *Palauchenia magna*, and which perhaps may be the same as the *Auchenia hesterna*. An inspection of Prof. Owen's figures of a series of molar teeth leads to the suspicion that he has inadvertently mistaken the upper series for the lower ones, and has thus been led to refer them to a genus different from Auchenia.

APRIL 22.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty members present.

The following paper was presented for publication :—

"Influence of Nutrition upon Sex among the Lepidoptera." By THOS. G. GENTRY.

Fungus Parasite on a Mouse.—Prof. LEIDY exhibited a mouse with several whitish masses adherent to the ears, side of the face, and nose. The mouse had been caught in the children's department of Blockley Hospital, and was submitted to his examination by one of the attending physicians, Dr. James B. Walker, who had informed him that he had observed a number of mice in the same condition. Dr. Walker had previously informed him of the curious affection of the mice, and it was at his suggestion that the present specimen was caught for examination. The white matter examined beneath the microscope proved to be composed

of sporular bodies, single, double, or in short chains of a dozen or more. They measure about the $\frac{1}{5\,0\,0}$ of a line in diameter. The fungus is a Torula or Oidium, and resembles that found in Aptha. Perhaps the disease in the mice is the result of feeding upon articles imbued with adherent portions of apthous matter from the mouths of children, and perhaps also the latter may become affected from diseased mice contaminating food or drink used by the children.

Dr. LeConte remarked that he had found in his father's house in New York, several years ago, a mouse exhibiting the same fungoid disease, and in the fungi were found specimens of a coleopterous insect of the genus Lathridius. The doctor also remarked that in a few days a cutaneous eruption appeared on his own person, which seemed to have been derived from the fungoid disease of the mouse.

APRIL 29.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

Augustus R. Hall, Kingston G. Goddard, M.D., and John J. Macfarlane were elected members.

On report of the committees the following papers were ordered to be published:—

ON THE AFFINITIES OF THE SIRENIANS.

BY THEODORE GILL, M.D., PH.D.

There exist, among the placental mammals, several well-defined groups combined together and differentiated from all others by the common character of atrophy, or entire want, of the posterior members as well as pelvis, a pisciform shape, and adaptation for habitual life in the water. These common co-ordinated characters have been supposed by most zoologists to indicate close affinity. A few, however, have considered them to be an insufficient index, and recognizing that one of these groups was more isolated than the others, and its members provided with a less abnormal skull, and with a dentition and intestinal canal adapted for a vegetable regimen, have approximated that group to the Pachyderm Ungulates. Such zoologists seem insensibly to have been influenced more especially by teleological considerations (adaptation for vegetable food and complexity of the intestinal tract), and size. Appreciating the vague (and very vague) similarity between the groups in question (the Sirenians) and the hoofed mammals, coincident with a comparatively large size (and thus contrasting with the other herbivorous mammals), and further struck with the agreement of the Sirenians with the hoofed mammals (Pachyderms) distinguished by the negative character of want of a compound stomach, they have combined the two into one order. Unwilling, however, to confess or even admit to self, the influence of such considerations, the *à priori* conclusion reached has been attempted to be substantiated by a selection of characters supposed to be common to forms of the two groups, while no exclusive diagnosis has been framed for the common group. But so strong has been the prepossession, in favor of the view of the affinities of the group in question, that it permeates and is felt in systems where it is not avowed, and this influence is evident in works of the latest writers.

Probability of Common Origin.

It is far more credible, in the opinion of the author, that the ordinary Cetaceans and the Sirenians are derivatives from a

common original stock—a generalized gyrencephalic type—whose form had already been modified for continued aquatic life by the reduction or atrophy of the hinder members, and that the existing orders represent the extreme specialization in diverse directions from such a common type, than that the two forms have independently diverged from two ambulatorial types. Even admitting the utmost differences that have been urged between the two forms, and the respective affinities of each to other forms, all such are still so indisputably related, *inter se*, as alone to suggest suspicions and doubts as to independent origin. Furthermore, it would appear more probable that such divergence had commenced from a type whose toes were separated and spreading, than from one whose digits and corneous appendage had already become specialized as hoofs; the difficulties, indeed, incident to the view of the development from a hoofed mammal of a mutilate form, are so great and obvious that reasons stronger than any yet given will doubtless be required before a general belief in such development, or in the very intimate affinity of the Sirenians and Pachyderms, prevails.

It must of course be granted that the pisciform mammals are the derivatives from quadrupedal types, for the evidence as to the line of descent from the lowest quadrupedal mammal to the higher, is unassailable; therefore, the terms embryonic[1] or synthetic are inapplicable to the pisciform mammals; on the contrary, those mammals must be considered as in the highest degree developed and specialized types, and if the extent of specialization in *any* direction were a true test of rank, their claims to the first rank would be indisputable.

Character of Progenitor.

As to the common progenitor of the Sirenians and Cetaceans, the evidence is by no means as clear as would be desirable. We have, in the Pinnipedia, a type that has been, in a high degree (compared with ordinary quadrupeds), specialized for aquatic life. The characters common to that type and the Fissipede carnivores,

[1] Prof. Agassiz has been able to see in the mutilate mammals "embryonic" types, considering the Cetaceans to be "embryonic" carnivores, and the Sirenians to be genuine "embryonic" types of Pachyderms. See Proc. Boston Soc. Nat. Hist., iii. p. 209, 1850.

and especially such non-adaptive characters as the union of the scaphoid and lunar bones, indicate their community of origin, and point to the derivation of Pinnipedias from a specialized carnivorous stock. The tendencies of the specialization in the Pinnipedia, as the great reduction in size of the milk teeth, the decreasing differentiation of the other teeth, and the modifications of the form, are towards the Cete; the extinct Zeuglodonts, and especially the *Basilosauridæ*, even indicate the possibility, if not probability, of the derivation of the Cete from a Pinniped avus. At the most, however, it can only be claimed that no quadrupedal type now exists, or has left its remains, so far as is yet known, which so nearly fulfils the conditions of intervention between ordinary quadrupeds and mutilates as the Pinnipedia. It is possible, however, that the resemblances in question may be adaptive, and it must not be forgotten that similar tendencies, but in a very minor degree, are exhibited by a specialized lutrine type (Enhydris, or sea otter). A careful comparative study of the detailed anatomy, and especially of the brain, in the generalized Educabilia,[1] and the Pinnipeds, Sirenians, and Cetaceans might go far to dissipate the doubts now involving the question, and determine the truth one way or another.

It appears, however, to be demonstrable, from what is already known of the brain and the organization generally, that the mutilates are at least the offshoots from the same common progenitor as the carnivores and other Educabilia; and in view of the near relations, even within the limits of the "super-order," it appears also to be much more probable that the two orders of mutilates have been derived from a common mutilate progenitor, than that they have diverged independently from two different types of quadrupeds within such circumscribed limits. Nor is there any cogent evidence, apparently, against the descent of the Sirenians from a mutilate descendant of a proto-inniped ancestor, either as to adaptation for a vegetable regimen or dentition.

The author has, therefore, felt obliged, after mature reflection, to adopt the views, current among most of the special students of the mammals, that the Cetaceans and Sirenians are orders more nearly related to each other than is either to any other order, and

[1] The author has not access to the material, at present, for such an investigation.

that consequently they should be approximated to each other in contrast with any forms to which they should be next placed, wherever that may be. In this respect, as already indicated, he is at variance with some most learned and accomplished naturalists, who have expressed decided views to the contrary; it being insisted by them that the Sirenians are most nearly related to the Pachyderm Ungulates, and even (by some of them) that those forms belong to the same special order as the Proboscideans, Hyracoids, Perissodactyle Ungulates, and Omnivora; in other words, the Cuverian order Pachydermata modified by the addition to it of the Sirenians.

Relations of Sirenians.

The affinities of the Sirenians and Ungulates have been urged with special emphasis, the view repeatedly reiterated in the United States, and even generally adopted by all but special students of mammals (and not even excluding all of them), and in one of our latest and most approved text-books on zoology, it is remarked: "The so-called Herbivorous whales, which Cuvier grouped with the Cetaceans, are now placed with the Pachyderms, with which they *undoubtedly* belong." It is, therefore, by no means a labor of supererogation to examine into the evidence which has seemed, to men justly celebrated for learning and acuteness, to justify such a combination.

The best epitome of the arguments (in English) in favor of such collocation, has been published by Dr. S. Kneeland, in a special memoir,[1] and for that reason it has been subjected to examination and analysis, the data classified (no distinction being made as to value or subordination in the memoir), and their value weighed.

It may be added, before proceeding to this analysis, that Dr. J. F. Brandt has also compared, at much length, the characteristics of the Sirenians with those of the Ungulates;[2] but he has exhibited their differences as well as certain resemblances, and has, indeed, been much more successful in the former portion of

[1] The Manatus not a Cetacean, but a Pachyderm; by S. Kneeland, Jr., of Boston, Mass. Proceedings of the American Association for the Advancement of Science. Third Meeting (1850), pp. 42–47.

[2] Symbolæ Sirenologicæ (1868), pp. 166–204; also, pp. 322–326.

his work than the latter. He, nevertheless, regards the Sirenians as most nearly related to the Pachyderms, although entitled to ordinal distinction, and even *more distinct* from the Pachyderms than are the Cetaceans from the Carnivores, which are connected by *intermediate* forms (*e.g.* Zeuglodonts, Seals, and Sea-otters), in this case of value and indicating affinity.[1]

The analysis of the cited memoir gives the following results:—

1*st. Characters supposed to differentiate the Manatee from the Cetaceans.*

These may be arranged under three categories, viz:—

a. Those really differentiating the Manatee from all the Cetaceans, to wit: the form of the vertebræ and the absence of ossified epiphyses, the form of the scapula, the structure of the anterior limb, the development of the occipital bone and the position of the condyles, and the form of the lower jaw.

b. Those *not* differentiating the Manatee from all the Cetaceans, but from peculiar sub-orders of Cetaceans, viz., the absence of a rostrum, position of the narial apertures, the presence of olfactory nerves, the development of the nasal bones, and "the two bones of the lower jaw [not] separate at the symphysis."

[1] (5) *Sirenia* in universum quidem nexum plus minusve propinquum cus variis mammalium divisionibus nominatis, cum *Pachydermatibus* potissimum, habent (ita ut a recentiorum pluribus adeo pro formis *Pachydermatum* aquatibilibus sint declarata). Formæ re vera intermediæ tamen (qualem inter *Mustelina* et *Phocacina* genus *Enhydris* præbet) nec inter *Sirenia* et *Pachydermata*, nec inter *Sirenia* et *Catacea*, nec inter *Zeuglodontes* et *Sirenia*, nedum inter *Phocacina* et *Sirenia* hucusque sunt repertæ. *Sirenia* potius non solum a *Cetaceis* et *Zeuglodontibus* et *Phocinis*, sed etiam a *Pachydermatibus* magis differunt quam *Cetacea* a *Feris*, quum *Cetacea Zeuglodontum* ope *Phocinis* appropinquentur, *Phocina* vero *Enhydribus* cum *Mustelinis* connectantur.

(6) *Sirenia* ignitur pro mammalibus mere aquaticis declarari poterunt, quæ corporis et plurium sceleti partium motubus aquatibus adaptorum figura et structura *Cetaceis* et *Zeuglodontibus* sunt connata et *Phocinis* parum similia apparent, ob indolem phytophagam (non ut in dictis mammalium divisionibus carnivoram) et structuram morphologicam ei congruam vero *Pachydermatibus multo magis* quam aliis mammalibus affinia observantur, nihilominus tamen, ob charecteres plures ipsis peculiares et formarum intermediarum absentiam etiam *Pachydermatibus* adjungi haud possunt, quare aptius, pro tempore saltem, ordinem peculiarem constituerunt.—Brandt, Symb. Siren., 1868, p. 359.

Certain *Zeuglodonts* are equally characterized by the absence of a rostrum, and the position of the narial aperture.

The Denticete alone are characterized by the absence of olfactory nerves, and the rudimentary condition of the nasal bones.

The Mysticete only are distinguished by the loose connection of the rami of the lower jaw at the symphysis.

c. Those *not* differentiating from the Cetaceans, or even from sub-orders, but only from minor types, viz., the non-consolidation of cervical vertebræ, the smaller number of vertebræ (50 to 53 against "at least" 60), the articulation of the ribs, the absence of asymmetry of the bones on each side of the head, and the presence of a lachrymal bone.

The *Iniidæ*, *Platanistidæ*, and others, have as completely separated cervical vertebræ as the Manatidæ.

The number of vertebra is less in *Inia* (41), *Pontoporia* (42), *Anarnacus* or *Hyperoodon* (44 to 45), and others, and is, at the same time, of very slight taxonomic value.

The articulation of the ribs is only of family value.

The asymmetry of the cranial bones is most evident in the *Physeteridæ*, very slight or almost none in many Denticete, and is not greater in the Mysticete than in the Sirenians.

The lachrymal bone is evident in the family of Ziphiids, and in the Mysticete.

Of course, then, only the characters differentiating the Sirenians as a whole from the Cetaceans as a whole can be considered as diagnostic or determinative of differences. The other alleged distinctions decrease in value in ratio to their restriction to subordinate groups.

But in addition to the characters alleged to differentiate the Sirenians from the Cetaceans, others may be found in the modifications of the brain, heart, etc., and all together amply support the validity of the distinction of the ordinal separation of the Sirenians from the Cetaceans, but they do *not* prove the propriety of their ordinal union with any Ungulates. This must be proved by the discovery of at least one character exclusively common to the Sirenians and Ungulates; we now propose to inquire if there be such.

2d. *Characters common and confined to the Sirenians and the Ungulate animals, or to any of the subordinate groups of Ungulates.*

These may be examined under several heads.

a. Characters exclusively shared with all Ungulates.

NONE.

b. Characters exclusively shared with all Pachyderm Ungulates; that is, with the Suiform Artiodactyle Ungulates, the Perissodactyle Ungulates, and the Proboscideans.

NONE.

c. Characters exclusively shared with all the Suiform Artiodactyle Ungulates.

NONE.

d. Characters exclusively shared with all the Perissodactyle Ungulates.

NONE.

e. Characters exclusively shared with all the Proboscideans.

NONE.

Thus does it appear that in the whole argument, no characters have been adduced which are common to all the Sirenians and the Ungulates, or even to them and any of the major subdivisions of the latter group. It is true that it is especially stated that the Manatee agrees with the Pachyderms and differs from the Cetaceans in the articulation of the ribs with the vertebræ, the form of the scapula, the position of the occipital condyles, and the union above of the parietal bones, and the inference might be justifiable from the context that the characters specified were *confined to*, as well as common to, the two groups, but such is not the case, for all the characters in question are shared with quadruped mammals generally. Being thus general, the characters are not decisive of immediate relation and must be excluded as common property.

It remains to examine into the taxonomic value of the other characters enumerated, which are now reduced to types of no more than *family*, and sometimes of inferior value.

f. The Manatee is said to resemble the *Hippopotamus* in the "orbits almost entirely encircled with bone," and in the lower jaw—that is, "in its curved form, descending angle, and symphysis."

As to the encircled orbits, the nearest allies to the Manatee have them open behind, and the nearest ally of the *Hippopotamus* (*Chœropsis*, belonging to the same family and very nearly related) has them also open behind; therefore, the slight taxonomic value of the character becomes at once evident.

As to the similarity of the lower jaw, the writer is unable to perceive it, and the related forms of Sirenians and Hippopota-

midæ differ much in the special characters alluded to. At any rate, any slight superficial resemblance that may be imagined is so completely offset by the fundamental differences between the two types as to the lower jaw, and the superficial differences in each of those types respectively in the modifications in question, as to deprive it of any taxonomic significance.

g. The Manatee is said to resemble the Tapir in the humerus, the nasal region, and the molars.

"The humerus somewhat resembles the human femur in its upper extremity; in its lower portion, it more nearly resembles, both in shape and size, the humerus of the Tapir than of any other Pachyderm." The likeness is rather confined to size; the similarity in shape is so vague as to make it a matter of opinion whether it is most like the humerus of the Tapir or some other Pachyderm: the statement may be best met by the observation that there is no such definite likeness as there is between the corresponding bones of the Tapir, Rhinoceros, and Horse, compared among themselves.

"In the great length of the nasal opening . . . in its horizontal plane . . . and in the shortness of the nasal bones (which cover only a small portion of the nasal cavity), the skull of the Manatus comes nearest to the Tapir among living Pachyderms." It is merely in the length of the "nasal opening" that there is any resemblance between the Manatee and Tapir; they differ *in toto* in the contiguous bones, and especially in the form and relation of the nasal bones.

"The molars [of Manatus] resemble, according to Mr. Owen, the teeth of some of the fossil tapiroid Pachydermata." So do they, in the same general way, resemble the teeth of the Proboscidean Dinotheriids, and those of the Marsupial Diprotodonts, and they differ strikingly therein from their immediate relatives. We have, therefore, double evidence of the slight significance of such resemblances, which, it is to be remarked, is also *not* a close but a superficial one.

Conclusions.

In fine, this analysis of all the characters enumerated as evidence of the affinity of the Manatee and Pachyderms elicits *no characters* that are at the same time *common to and confined to* the

same types, and therefore diagnostic of the combined types. All the characters are referable to the following categories:—

1st. Characters differentiating the Manatee from the Cetaceans, which (after proper restrictions) are granted, and more than granted.

2d. Characters common to generalized and quadruped mammals, and therefore not distinctive.

3d. Characters confined to *distant* isolated and *specialized* types of subordinate value, and whose very isolation and specialization are evidence of their slight taxonomic significance.

There is NOT A QUESTION OF ALTERNATIVES, as might be supposed from the arguments noticed, between the Cetaceans *or* the Pachyderms. Even if all the differences urged as distinctive of the Sirenians from the Cetaceans were conceded, the views here advocated—that the Sirenians are a distinct order—would loom forth in proportionately more imposing form, *but* such differences cannot be cast into the scale of the Pachyderms, as evidences of affinity with them, since they are of either a more generalized or specialized value.

THE SIRENIANS NOT PACHYDERMS.

In view of these facts, it seems evident that we must answer the question proposed ("From these differences must we not remove the Manatus from Cetacea and place it among Pachydermata, where it stands in the same relation as do the seals among the other Carnivora?") decidedly in the *negative* as to the latter and capital clause (but affirmatively as to the former and subordinate one). This we are more prepared to do after having ascertained that the advocate who has found no characters common and confined to the Manatee and the Pachyderms has found several characters *common* to and *confined* to the Manatee and the Cetaceans.

It may be added, too, that some of the characters which are, in a measure, shared by peculiar forms of Sirenians and Ungulates are adaptive or teleological modifications, having reference, however, to analogous rather than identical ends, and even requiring some effort of the imagination to detect the resemblance supposed to exist. They are special characters gained by highly modified forms, whose well-ascertained affinities forbid the idea of their

inheritance from a common stock, and which equally forbid the idea of considering them as indications of affinity or likeness even from a metaphysical point of view.

Further Considerations.

Among other characters supposed by various authors to justify, or even render "too evident not to be immediately appreciated,"[1] the relations of the Sirenians and even true Cetaceans to the Pachyderm Ungulates, are the considerable relative size and coordinate increase of special parts, "the thick and naked skin," "the variable and irregular teeth," as well as station. The variability and wide range in size and concomitant development within the limits of a strictly natural group is, however, evidence of the little value of the character, the skin is not naked in any Pachyderms, and it is not obvious how irrelative variability in dentition is indicative of affinity when it presents no other elements of similarity for comparison. Finally, even conceding the value of station as an element for the determination of ordinal affinities, it is not "obvious" why the horses, the rhinoceroses, and allied types, should be regarded as pre-eminently frequenters of rivers and marshes. To the writer, at least, the affinities claimed are *not* evident.

Genealogy of Sirenians.

The special relations among themselves of the Sirenians, at least of those whose skeletal remains are in good part known, appear to be tolerably evident, thanks to the labors of various zootomists, but above all of Prof. Brandt.[2] In *Halitherium* we have the most

[1] "The relationship between the Cetacea [*Cete* and *Sirenia*] and the next order ["*Pachyderma*"] that offers itself to our notice is too evident not to be immediately appreciated. The thick and naked skin, the gigantic body, the massive bones, the bulky head, and even the variable and irregular teeth that arm the ponderous jaws, are all again conspicuous in the PACHYDERMATA; and the river and the marsh, the localities frequented by the latter, as obviously indicate the intermediate position which these animals occupy between the aquatic and the terrestrial mammalia."—Jones's (Thomas Rymer) General Outline of the Organization of the Animal Kingdom, 4th ed., 1871, p. 809, § 2201.

[2] Brandt (Johann Friedrich). Symbolæ sirenologicæ, [fasciculus I.,] quibus praecipue Rhytinæ historia naturalis illustratur. .... (1845) < Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg.

generalized type, manifested as such by the less specialized dentition, as well as by such osteological characters, among others, as the greater development of the representative of the pelvis (made known by Kaup) and the larger and more approximated nasal bones.

The forms to be approximated to *Halitherium*, as the nearest ally, is, in the present condition of our knowledge, a problem concerning which a reasonable difference of opinion may prevail, *Halicore* and *Manatus* (*Trichechus*) each having claims to such alliances. Brandt has, however, conjoined with it, as a more immediate relation, the genus *Halicore* (to which naturally succeeds *Rhytina*), and has associated the three genera mentioned in a single family, to which he has given the name *Halicoridæ*.[1] The differences between those genera are, however, of greater taxonomic value than generic, and appear to well merit the distinction of family rank, which has been already conferred on them by several naturalists. With such value, therefore, those genera have been accredited now, but as they form a natural series they have been combined in a special superfamily (*Halicoroidea*). The difference between the extremes of that superfamily is, at least in some respects, greater than between its most generalized type and the remaining well-known members of the order—(*Trichechidæ* or *Manatidæ*)—and to mark the limit in a specialized direction of the series, the superfamily is adopted.

The *Manatidæ* (*Trichechidæ*) succeed then, not as most nearly related to the extreme term of the preceding series, but as so nearly related to the proximal term as to perhaps even merit further examination, whether they are not really more nearly related to it than the dugongs, and consequently better entitled to be associated with it in contradistinction to the others. The capital character of the *Halicoridæ* of Brandt (the *Halicoroidea*

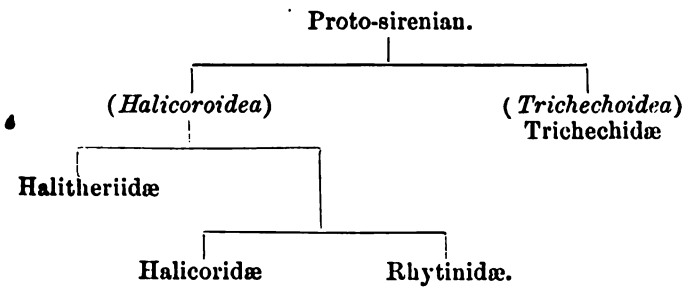
Sixième série. Sciences mathématiques, physiques et naturelles. Tome VII. Seconde partie: Sciences naturelles. Tome V. ···· 1849.—Zoologie et physiologia, 1—160, pl. 1—5.

Symbolæ sirenologicæ. Fasciculus II. et III. Sireniorum, Pachydermatum, Zeuglodontum et Cetaceorum ordinis osteologia comparata, nec non Sireniorum generum monographiæ. ···· Petropoli, 1861-68. [4to., 3 p. l. (383 + 1) pp. 9 pl.] <Ib., VII^e série, Tome XII., No. 1.

[1] The outlines of the brain, as illustrated by Brandt, seem to verify the naturalness of this classification.

of the present arrangement), that is, the depressed caudal vertebræ and the development of transverse processes, has not been confirmed as to the *Halitheriidæ*, and is applied on the supposition that it is a co-ordinate of the other characters in which it approximates most to the dugongs. It must depend on future discovery whether the aggregate of common characters and the taxonomic value of those characters confirm the present combinations.

With respect to the *Halicoridæ* and *Rhytinidæ*, the conditions of a natural sequence are apparently best fulfilled by the approximation of the former to the *Halitheriidæ*. The *Rhytinidæ* exhibits a highly specialized modification in several features, and especially in the absence of teeth and the length of the intestinal canal; it, however, affords a more generalized condition than the *Halioridæ* in other respects, and notably in the development of the carpal bones, and cannot, therefore, be regarded as a derivative from the *Halitheridæ* family as now limited. But as it exhibits in all respects a less generalized condition than the *Halitheridæ*, it must be regarded as the result of development since the culmination of that type. The genealogical tree of the order may then be represented as follows:—



Various other extinct forms have been referred with more or less reason to the order, but they are too little known to be introduced with certainty into the system.

OBSERVATIONS ON CHANGE IN STRUCTURE OF A LARVA OF DRYOCAMPA IMPERIALIS.

BY THOMAS G. GENTRY.

I desire to call the attention of the Academy to some important structural changes in a larva of *Dryocampa imperialis*, which came under my observation during the early part of last August, as they show sufficient reasons, in my opinion, for the withdrawal of the *imperialis* of Drury, from the new genus of Dryocampa, and its reinstatement in the old one of Ceratocampa. Besides, they afford additional proofs to the many which have already been noticed by naturalists, of the incompetency of Darwin's theory of natural selection in every case, to account for the origin of species, by minute, indefinite, fortuitous variations, without the aid of other and more important causes.

In this vicinity, during the last four years, I have found the larva of *Dryocampa imperialis* feeding principally upon the leaves of *Juniperus communis* and *J. Virginiana*, and occasionally upon some few species of Pinus; but prior to the above time, so far as I have been able to determine, it has never been observed feeding upon the various species of Juglans, etc., in company with the larva of *C. regalis*.

At the time above mentioned I found the larva of what I supposed to be the *C. regalis* feeding on an English walnut. I felt no little surprise at the unusual appearance which it presented, and I was at first somewhat dubious, whether to refer it to *C. regalis* or *D. imperialis*, as it contained marked characters of both. If it had been in one of its earliest stages, it would not have excited wonder since the young of the two bear such a close resemblance to each other; but this specimen had attained the period of its final change. In size, color, and the nearly equal development of the spinous projections of the dorsal surface of the thoracic segments, it agreed with *C. regalis;* in the diminutiveness of the abdominal projections, and in the moderately sized hairs which rather closely invested the worm upon the superior and lateral surfaces, it agreed with *D. imperialis*. I might add that the chrysalis approximates the genus Ceratocampa in general appearance, and in the conformation of the terminal appendage or spine, more nearly than Dryocampa.

These characters would seem to imply a case of hybridism, but I think differently. Having raised scores of the males and females of both species in the same box, I have never observed a single irregular union—the males of both invariably seeking their own kind. So deeply is the sexual instinct implanted in them that the females, rather than submit to copulation with species essentially unlike, deposit their ova unfertilized. I am inclined to the belief that *C. regalis*, being a higher type of insect than *D. imperialis* had been evolved from the latter in obedience to internal changes brought about through the medium of nutrition; said changes having been moderately sudden instead of slow and gradual.

That nutrition plays such an important part in the evolution of species, may seem to be speculation, without facts to sustain it. If nutrition should be proved to be the means by which the sexes in insects are controlled, as a paper in "The American Naturalist," by Mrs. Mary Treat, would indicate, I cannot discern why it should not be applicable to a certain extent to the production of species.

In the case under consideration, the change from diet containing but a small percentage of nutritive matter, as leaves of conifers possess, to more nutritious food, has, in my estimation, been the agent in producing the changes above indicated. That these changes have not been going on for indefinite periods, but have been the work of a short time, I think is evident.

If, through the medium of nutrition, *D. imperialis* is brought to assume many of the prominent characters of *C. regalis*, I do not see the propriety of placing the former in a distinct genus from the latter, in consequence of a slight difference in the size of the antennæ, and in the position of the posterior wings in a state of rest in the adult state: as the close resemblance which obtains between the two larvæ when young, seems to imply a near relationship. Harris, in referring *D. imperialis*, of Drury to Dryocampa, did so under considerable hesitation. The fact that there is such a near alliance, backed up by those set forth in this paper, if they are rightly interpreted, would seem to warrant its reinstatement in the old genus Ceratocampa.

MAY 6, 1873.

Dr. CARSON, Vice-President, in the chair.

Thirty-two members present.

Double Flowers in Epigæa repens.—Mr. THOMAS MEEHAN observed, that on several occasions, during the few past years, it had been noticed among the *variations in nature*, that the tendency to produce double flower was, by no means, the special prerogative of the florist to produce. Many of our commonest wild flower, which no one would think of cultivating, had double forms in cultivation which were no doubt originally found wild. Thus we had a double *Ranunculus acris*, *Ranunculus bulbosus*, *R. Ficaria*, *R. repens*, and some others. He had himself placed on record the discovery, wild on the Wissahickon, of a double *Saxifraga Virginica*, and this season a fellow member, Dr. James Darrach, had found, in the same location, a double Trailing Arbutus, *Epigæa repens*. There were, in plants, two methods by which a double flower is produced. The axis of a flower was simply a branch very much retarded in its development, and generally there were, on this arrested branch, many nodes between the series forming the calyx or corolla, and the regular stamens and carpels, which were entirely suppressed. But when a double flower was produced, sometimes these usually suppressed nodes would become developed, in which case there was a great increase in the number of petals, without any disturbance in the staminal characters. But at other times there was no disturbance of the normal character of the axis. The stamens themselves merely became petaloid. This was the case in the *Epigæa*, now found by Dr. Darrach. He was not alone in calling attention to these facts in wild flowers. Dr. Gray and others had recorded instances in the *American Naturalist*.

Influence of Cohesion on Change of Characters in Orchideæ.—Mr. M. also said that in the early part of the winter he had exhibited some flowers of *Phaius Tankervillæ*, in which, by the mere cohesion of one of the dorsal petals with the column, a flower differing very much from the general condition was the result; and that it was evidently the direction of nutrition towards the production of a spur, which resulted in the formation of the labellate petal which gave such a distinguishing character to the general orchideæ flower. At that time he had observed that very early in the morning a very small secretion, from what appeared to be incipient glands, might be seen at the exterior base of the outer petals, and that there was no improbability that in time an orchid would be produced, which would have, from

these glands, three spurs and their petals, giving the flower the appearance of an *Aquilegia*. Since that time Dr. Maxwell T. Masters, in the April 12th issue of the *Gardener's Chronicle*, notices the receipt of a *Phaius Wallichii* in which there had been produced three spurs and regular petals, looking, Dr. M. says, rather like those of a gladiolus than of an orchid. This confirmation of the views, suggested in the observations referred to, indicate that we were on the right track as regards idea of the floral structure.

Movements in Stigmatic Lobes.—Mr. MEEHAN further remarked that at former meetings he had brought to the attention of the Academy, that though it was long known that the flattened lobes of the pistil in *Mimulus* would close on being touched, as rapidly and in the same manner as the leaves of the *Dionæa muscipula*, it did not seem to have been noted that the power was possessed by many other genera of *Scrophulariacæa*, and he had recently recorded the fact that the power extended to *Bignonia* in an allied natural order. It would be as well to call the attention of the Academy to the fact that in the current number of the *London Journal of Botany*, Mr. Kitchener has a note on the movement in *Mimulus*, regarding it as an arrangement to render the fertilization of the plant, by its own pollen, highly improbable. If it were not for the closing of the lobes on the entrance of an insect, pollen would be deposited when the insect makes its exit; but the closing of the lobes on the entrance prevents this. On the other hand, when the pollen covered insect enters another flower and touches the open pistil it receives and closes on foreign pollen. As the common trumpet flower of our gardens, *Bignonia radicans*, is easy of access, he hoped that the members interested in this branch of science would make personal observations the coming season.

MAY 13.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-eight members present.

The following paper was presented for publication:—

"Observations on Nests of Sayornis fuscus." By Thos. G. Gentry.

Prof. COPE exhibited and described some extinct turtles from the Eocene strata of Wyoming. One of these was named

TRIONYX HETEROGLYPTUS, Cope.

Carapace broad, flat, concavely truncate behind. Free portion of costal bones short. The last pair of costal bones are in con-

tact by a common suture by about two-thirds their width, the anterior portion being separated by the last vertebral bone. There is a great difference in the sculpture of the middle of the carapace and its lateral portions. The former region is closely ribbed longitudinally, the intervening grooves being mostly uninterrupted. On the middle portions of the costals the ridges are more or less broken up, and distally they are very delicate, forming an isosculating pattern inclosing small pits. On the last costal they retain their ridge like character. The posterior vertebrals are marked by a single groove down their middle.

Width of carapace at antepenultimate costal bone	0.235 m.
Length from front of do. backwards	.095
Width of do. costal distally	.048
Length of last two vertebrals	.037

Excavated from the Bridger bed on the summit of Church Butte by the writer. A new genus, PLASTOMENUS, Cope, was described as allied to *Trionyx*? No marginal bones of the carapace except a nuchal: extremities of ribs little or not projecting beyond costal bones. Plastron united with carapace by one or two tooth-like processes of the hyposternal bones. An anterior production of the hyosternal inclosing a median fontanelle and uniting by a broad suture with a clavicle (episternal).

This genus is highly interesting as connecting more or less nearly the genus *Trionyx* with the *Chelydrine* form *Anostira*. It is represented by several species in the Bridger Eocene, all of which have the sculpture of both of the genera named. The plastron is ossified nearly as in *Anostira;* but in the numerous specimens obtained there was not one marginal bone. Nevertheless the strong emargination of the proximal end of the second costals proves the presence of a nuchal marginal which does not exist in *Trionyx;* if there were other marginals they must have been small and inclosed in a cartilaginous margin. The first costals were much shorter than the second, and much as in *Trionyx*. A costal process of the first dorsal extends backwards and was attached by suture to the second costal bone, just in front of its capitulum, as in *Trionyx*, *Chelydra*, *etc.* A singular sternal bone accompanies the specimens of *P. thomasii* and *P. trionychoides*, but partially fractured in both cases so as to leave its position uncertain. It can be nothing else than the median portion of a hyosternal with the outer extremity wanting. It bounds a fontanelle interiorly, which nearly reaches the hyposternal; anteriorly it has sutures for both mososternum and clavicle. It is entirely unlike anything in *Trionyx;* it is thickened towards the median line and strongly sculptured externally. The hyo or hyposternal in the "bridge" indicates that portion to have been long, and about as wide as is usual in *Trionyx*. Its free edge is thin; the sutural union with the other component bone complete. The type of the genus is *P. thomasii* (Trionyx thomasii, Cope).

Other species have been referred by me to *Anostira*. These are *P. trionychoides*, *P. oedemius*, *P. molopinus*, and a larger form, *P. multifoveatus*.

MAY 20.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

The following papers were presented for publication:—

"Description of new species of Orthoptera, collected in Nevada, Utah, and Arizona, by the Expedition under Lieut. George M. Wheeler." By Cyrus Thomas.

"Observations on the Habits of the Neuters of Formica sanguinea." By Thos. G. Gentry.

Lilium Washingtonianum.—Mr. THOMAS MEEHAN referred to a paper by Prof. Alphonso Wood, entitled a *Sketch of the Natural Order of Liliaceæ* of the Pacific coast, published in the volume of the Proceedings for 1868, in which he describes a "new species" of *Lilium*, as *L. Washingtonianum*, giving, as a reason for the name, that it was generally known as the "Lady Washington" by the miners. Prof. W. said, in his paper, that it was remarkable so fine a plant had been overlooked by other botanists. It so happens that it had not been overlooked, but had been described ten years previously by Dr. Kellogg, in the Proceedings of the California Academy for 1858. Through the unusual circumstance of two authors employing the same name, the confusion and trouble which loose and careless habits in describers bring on students, in the present case, will not be great; yet it is but just to Dr. Kellogg that this correction should go into the records of the Academy.

On a Species of Delphinus.—By Dr. H. C. CHAPMAN. The presentation of a specimen of a male dolphin to the Museum this evening gives me the opportunity of calling attention to some points in the economy of the Cetacea, and of noticing that the structure of the specimen before us offers a good illustration of the descriptions given by Cuvier, Owen, and others, of this order of mammalia.

Of the external characters the most striking are, the well-developed caudal fin, the effective instrument of locomotion; the dorsal and pectoral fins, the blow hole, the very small external opening of the organ of hearing, and the genital aperture.

The digestive system exhibits a highly complex stomach, divided into several cavities, the œsophagus and duodenum being large.

There is no demarcation between small and large intestines, but they are of great length. This is as might be expected when one considers the vast amount of nutriment required by a lung-breathing animal living under such conditions of existence.

The circulation of the blood offers us interesting peculiarities in the existence of vast plexuses, the breaking up of the brachial and other arteries into rete mirabile. Of the distribution of the arteries, the intercostals are the most remarkable. They are developed, twisted, interlaced to such an extent, as to give the appearance of a large thoracic gland, formerly in fact described as such. By this arrangement of the intercostal and other arteries there are formed large reservoirs of arterialized blood, enabling the animal no doubt to remain submerged for long periods of time.

The dividing of the brachial artery into numerous branches has been explained by reference to the shortness of the pectoral fin or upper extremity, but this distribution has been observed in certain Lemurs and other animals, in which the upper extremity is well developed.

The lungs were large in the specimen before us, and the trachea gave off a third bronchus.

The kidney was divided into many distinct lobes, each of which was supplied by a branch of the renal artery.

In conclusion, we take the opportunity of impressing the members with the importance of obtaining as many specimens of the Cetacea as possible. Naturalists have experienced much difficulty in identifying the different members of this order, due no doubt to their want of material.

MAY 27.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-nine members present.

The following gentlemen were elected members:—

Dr. Thos. N. Penrose, U. S. N., C. Tower, Edw. Wright, Wm. Massey, and Chas. E. Betticher.

Dr. Thos. R. Frazer, of Edinburgh, and Dr. Wm. H. Jones, U. S. N., were elected Correspondents.

The following paper was ordered to be published:—

INFLUENCE OF NUTRITION ON SEX AMONG THE LEPIDOPTERA.

BY THOMAS G. GENTRY.

That the sexes among plants are controlled by the *law of nutrition*, I think has been demonstrated by Mr. Thomas Meehan, in his communications to the Academy of Natural Sciences, published in its proceedings, in the *American Naturalist*, and in other scientific journals. The facts which appear in his contributions upon this subject were the results of close research and careful study. To him must be ascribed, not only the credit of having established the existence of the afore-mentioned law, but also the hint of its potency in animals.

Mrs. Mary Treat, I believe, is entitled to the credit of first showing its applicability in insects, in a paper which appeared in the *American Naturalist* for March, 1873. The facts set forth in her paper were founded on observations upon the larvæ of some species of Diurnal Lepidoptera during the summer of 1872. The inferences which she drew from her observations were substantially as follows: Whenever the larvæ were deprived of food, or were stinted in quantity, in the interval between the last two changes, males were produced in the generality of cases; but when the food was regularly supplied, and in bulk necessary for the wants of the larvæ, the opposite sex was almost invariably produced.

The facts which I have to offer bearing upon the genesis of sexes, date back to the summer of 1871, whilst engaged in the rearing of the larvæ of many of our Twilight and Night Fliers, and in the study of their various metamorphoses. The discovery was the result of accident: I had confined a number of the larvæ of *Attacus cecropia*, *A. polyphemus*, *A. prometheus*, and *Saturnia Io*, in a box, and had neglected to supply them with food for four days. These larvæ had advanced toward their final change, possibly within a week or ten days. When I opened the box, the greater number, which fell not much short of a score and a half, had concealed themselves within cocoons; the remainder still wandered about, as if in quest of food, or seeking for some opening through which to escape. These latter I removed from the box to another, where they were provided with an abundance of food. They immediately recommenced feeding. After three or

four days they began to assume the chrysalis form. After several weeks I removed the usual silken covering, as has always been my custom, from the fact that past experience has shown me that the development proceeds more rapidly, especially when they are kept in a room where the temperature through the cold season of the year falls not short of 70° Fah. I was surprised to find that those which had changed first turned out to be males without exception, while the last batch, consisting of a dozen cocoons, proved with but two exceptions to be females. Here was a problem to solve, and in reflecting upon the subject it occurred to me that possibly Mr. Meehan's *law of nutrition* would furnish me with an explanation of it. I conducted a series of experiments during the ensuing summer, to test the truth of my observations. Accordingly in August and September I procured besides specimens of the larvæ above mentioned, many of the *Ceratocampa regalis*, *Dryocampa imperialis*, *Sphinx quinquemaculata*, *S. carolina*, *Smerinthus excæcata*, and others of the Sphinx family. These worms were taken while passing through the period intervening between the last and the preceding changes. In nearly every case the worms were selected as shortly after the next to the last change as was possible. These worms, amounting to three scores, were divided into two equal sets and placed in separate boxes. The one set was deprived of all food; the other was kept provided with fresh, wholesome fare in abundance. The members of the first set, after the expiration of a few days, began to appear exceedingly restless, as if looking for some convenient place to hang their cocoons, or to deposit their chrysalides. Those of the second kept on feeding for a week or ten days, and then began to undergo their final transformation. The difference in the appearance of the two sets was quite perceptible. The former were small, and presented the look of animals that had been ill-fed; the latter were large and plump, and showed evidence of having fed sumptuously. After allowing sufficient time to elapse for the chrysalides to form and harden, I began the work of divesting them of their cocoons. I found that the chrysalides of the one, as the greater breadth of the antennæ, which was already mapped out, would seem to indicate, were invariably males, while the other, judging from the narrowness of the antennæ, proved with but two exceptions to be the opposite sex. The chrysalides of the Sphinxes presented a similar state of affairs. The appearance of the perfected

moths proved that the sexes had been distinctly indicated by the difference in the breadth of the antennæ as observed in the chrysalides.

During my observations and experiments the following additional facts came under my notice: Firstly, that males are the invariable result when the larvæ are fed upon diseased or innutritious food; secondly, that in the fall of the year, when the leaves have become deprived of their usual amount of sap, males are generally produced; thirdly, that more males are produced late in the season than females; fourthly, that the sexes in early life cannot be distinguished, or in other words, that there would appear to be no such distinction as male and female, the change being brought about late in life through the medium of nutrition.

APRIL 3, 1873.

Meeting of the Conchological Section.

Dr. W. S. W. RUSCHENBERGER, Director, in the chair.

Dr. F. A. HASSLER presented the following memorandum of experiments by Wm. M. Gabb and himself to ascertain the tenacity of life in *Littorina muricata*. The specimens, 140 in number, were collected by Mr. Gabb in St. Domingo, September, 1870, and hung in a basket in his office.

A few (5 or 6) were moistened after three months, then each month until May, 1871, when all were alive. May, June, July, and August, 1871, 25 were moistened each month, and all found to be living except 2 in July and 2 in August. These were each month laid aside and not moistened again until September. At this time 40 of the original lot remained, all were moistened, and 29 found to be alive. In September, of the 100 which had been moistened during May, June, July, and August, 89 were alive. The 118 living ones were all placed together.

Feb. 18, 1872, the lot was again moistened and about 60 revived at once, and after several hours all but 24 were or had been crawling. These 24 were rejected.

March 30, 1872. Of the remaining 94, 10 were moistened, 9 were alive; these 9 were placed aside with a few which had given evidence of life since the last experiment, Feb. 18.

Sept. 18. All moistened and found living; they were also all alive in December.

Feb. 12, 1873. Two found to be dead, and were separated from the others.

March 26. All moistened, and though exposed for three days, only one began to crawl; this one was separated, also 27 others which were known to be dead, leaving 65 undetermined.

MAY 1, 1873.

Meeting of the Conchological Section.

Dr. RUSCHENBERGER, Director, in the chair.

Mr. TRYON called attention to an interesting series of land and fluviatile Mollusca from Utah, presented this evening.

These shells were collected by the Wheeler Exploring Expedition, acting under authority of the U. S. Engineer Office at Washington.

The specimens of *Helix strigosa*, Gould, exhibit every variation of form from the typical shells with depressed rounded whorls and smooth surface, to those with several revolving raised lines and a carinated periphery; in the latter condition they are identical with *H. Hemphillii*, Newcomb (Amer. Journ. Conch. v. 165, 1869, "White Pine Mining District"). In others, again, the raised lines are more numerous and sufficiently prominent to be called ribs, and the periphery is not carinated; in this state they are *H. Haydeni*, Gabb (Am. Journ. Conch. v. 24, 1869).

The latter species has been heretofore considered to belong to a new generic type for America, being the only species having revolving ribs: its nearest relationship was apparently with a small group of Madeiran Helices. The form of the shell, its external appearance, and the closely approaching extremities of the labrum, connected by a callus upon the parietal wall, reminds one of *Cyclostoma;* but no opercula were obtained with the fifty odd specimens in semi-fossilized condition, collected by Prof. F. V. Hayden, in Webber Cañon, Utah.

It is extraordinary that any species should be found to vary so much as does *H. strigosa*, in those characters which have heretofore been regarded as most persistent and distinctive. It is much easier to imagine the growth lines developed into ribs, than a form in which the growth lines are crossed by revolving ribs. In *H. Idahoensis*, Newcomb (*Ibid.* ii. 1, 1866), we find the surface raised into sharp ribs parallel with the lines of accretion, and, as in all other respects, this species does not appear to differ from *strigosa;* it is very probable that *Idahoensis* will also prove to be a variety of this protean species.

Included in the collection are two specimens of the genus *Tryonia*, Stimpson. This curious little genus was heretofore considered to be restricted to the Colorado Desert of southern California, where, in a fossilized condition, it exists in such numbers as frequently to cover the surface of the ground. Two species have been described, viz., the type *T.* (*Melania*) *exigua*, Conrad, of which *Melania protea*, Gould, is a synonym, and *Tryonia clathrata*, Stimpson. The two Utah specimens are probably *T. exigua.*

The genus *Tryonia* is included in a group of very small species of Amnicolidæ, having the whorls ornamented by ribs, nodules, or spines; it includes the genera

Paludestrina, Orb., 1841. West Indies and S. America.

Pyrgula, Crist and Jan. 1832. Europe.[1]

Potamopyrgus, Stimpson, 1865. New Zealand.

In addition to the above, the collection includes *Succinea lineata*, W. G. Binney, *Limnæa palustris*, Müll., *L. stagnalis*, Linn., and *L. desidiosa*, Say, *Physa elliptica*, Lea, and *Planorbis trivolvis*, Say; the latter very large specimens with the margin of the aperture expanded like those from the St. Lawrence River, described by Mr. Whiteaves as *Pl. macrostomus.*

[1] Mr. John Wolf has described *Pyrgula scalariformis*, from the post pliocene near Tazewell, Illinois River. Other minute species may be detected hereafter, when our rivers are more carefully explored, as in France a number of new species have rewarded the minute research of recent collectors.

JUNE 3.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-two members present.

Fertilization of Pedicularis Canadensis.—Mr. THOMAS MEEHAN drew attention to the structure of the flower of *Pedicularis Canadensis*, in which it was evident self-impregnation was impossible, and there seemed to be no special arrangements for fertilization by distinct agency, as there were in so many allied plants. In this case the stamens were included in the closely compressed arch of the corolla, and, with the anthers, were directed retrorsely to the pistil, which at an early stage, and long before the maturity of the pollen, was protruded beyond the corolla, rendering self-fertilization almost impossible in this flower. But the flowers were always abundantly fertile, and though the arrangements were such as seemingly to afford no chance even for insects to aid in the fertilization, it was also probable that in some way it was accomplished by them. Both last season and this he had devoted some time to watching the plant, but failed to find any clue to the process. A species of *Bombus* seemed to have the plant especially under its charge, visiting the flowers in great numbers; but they bored through the corolla on the outside of the tube for the saccharine matter, and the anthers or pollen did not seem to be in the least disturbed by this. Still it was so highly probable that in some way some insect aided in the cross-fertilization of these flowers, that it might serve a useful purpose to direct attention to it, as others with time and opportunity might discover what he had failed to find.

JUNE 10.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-two members present.

Mr. GENTRY made the following remarks:—

At the last meeting of the Academy, Mr. Meehan made some observations upon the peculiar structure of the flowers of *Pedicularis canadensis*, observing that he had vainly watched them during two seasons with the view of determining the manner in which they were fertilized. He further said that he had noticed that they received the attention of a species of bumble-bee, for the sake of their honey, which in order to accomplish its purpose always bored a hole into the side of the tube.

On Wednesday morning last, I visited a spot where the plants were growing luxuriantly, affording an interesting field for observation. It was not long before I observed a *Bombus terrestris* to alight upon the outer side of the tube of a flower, at a distance of three feet from me. At this distance it did seem as if the bee in order to obtain the honey which the flower secretes, produced a slit into the tube, as Mr. Meehan observed. But the movements of the bee being so quick, and the distance too great to judge accurately, I approached the insect by degrees, until I was within three inches of it, when the whole process became apparent. The bee, however, was so intent upon its labors, as not to take any notice of me.

The flower is composed of an erect tube, with a natural cleft running along its lateral walls from above, through one-third its entire length, presenting outwardly apparently a mere crease, from the manner in which the compressed margins of the upper lip fit into the rolled-in edges of the lateral lobes of the under lip. The upper lip is compressed, arched, and beaked, presenting an aperture at the apex, through which passes a curved pistil, the lower lip is reflexed, consisting of three lobes, one median and two lateral, assuming a platform arrangement. Enclosed within the upper lip are four stamens, didynamous, with their anthers turning backwards, facing each other ventrally. When ripe these anthers split upon the inner side, thus giving a fancied resemblance to an oval snuff-box, thrown backwards upon its hinges. Each cell is filled with white pollen grains.

Now when the bee alights upon the tube, by means of its trunk, it opens the natural cleft above alluded to, and having thus gained a partial entrance, it would defeat its intention, did not the length of the flower's tube when contrasted with that of the bee's trunk, necessitate the admission of the entire head also. In this operation the lips of the flower are pressed apart, the margins of the upper lip are separated to receive the head, and the pollen grains, already ripe, by the considerable motion to which they are subjected, become dislodged from their cells, and fall down in a dense shower upon the bee's back and head. Having obtained the coveted sweet, it flies to another flower upon a different stalk, as I observed in a score of cases during two days; but before renewing the preceding operations, stations itself awhile upon the lower lip, its head coming in contact with the stigma of the pistil. Then, by means of the hairs that line the inner side of the tarsus of each anterior leg, and the constant rubbing together of the parts comprising its trophi or instrumenta cibaria, the attached pollen grains are sent flying in every direction, sure to adhere to the stigma.

Whilst observing the above process, I also noticed that after the lips had been pressed apart and were permitted to regain their position, the upper lip, being somewhat elastic, sprung back to its place with considerable force, sending through the aperture,

through which passes the pistil, a complete cloud of pollen, enveloping the stigma upon every side.

This operation can be performed artificially, by taking hold of the under lip with the left thumb and fore-finger, and pulling the upper lip backward, by the right, and then releasing the hold of the latter: the upper lip springs to its place, spirting the pollen through the aperture upon the left hand. From the above it is to be seen, that the plant has two chances of being fertilized—one by its own pollen, and the other by that of another. Although the flower seeds abundantly, yet I am disposed to think that it is mainly through the pollen of another that the seeds become perfect.* I incline to this opinion because, in an examination of many pods, I noticed that a few seeds were found in a rudimentary condition, apparently manifesting a tendency to abort, while the majority were in a vigorous condition; the former, doubtless, being the effects of self-fertilization in part, which, as is well-known, is a degenerating process.

I desire also to call attention to an interesting discovery which I was enabled to make recently, whilst engaged in an examination of a double flower of *Ranunculus fascicularis*. In the genus Ranunculus, the corolla of a normal flower is made up of five petals, each of which on the inner side of its basal part is usually provided with a scale. This scale from its position is denominated the *nectariferous scale*.

In the specimen under consideration three of these scales had assumed the character of petals, agreeing with the flower's true petals in every particular except size, being but three-fourths the dimension of the latter. It very frequently happens that we find, in examining flowers, parts which we can refer to no organ with which we have become acquainted. They appear to be distinct from any of the whorls which make up a perfect flower, although located among them and attached perhaps to them. All such parts are designated as appendages. Under this category are placed the scales that are characteristic of some species of Crowfoot.

Prof. Lindley thinks that these small appendages are barren stamens united to the bases of the petals. This opinion I think is a just one.

From the facts here indicated it is reasonable to conclude, that the double flowers of the Ranunculus do not always originate by true staminal metamorphosis, but sometimes by scale transformation; also that nectariferous scales when they exist are barren stamens, which favorable conditions may develop into true petals.

Whilst examining several specimens of *Potentilla* canadensis lately, I was struck with the variableness displayed in the number of segments which constituted their outer or calycine whorls. This series in *Potentilla*, as is well known, consists of five sepals, with as many intermediate bractlets.

In the specimens to which I refer, I counted from seven to ten bractlets. This numerical variation I am confident results from the splitting, so to speak, of some or all of the primary bractlets, as specimens were observed which exhibited all the transitional forms, from a slight indentation at the apex to partial and complete division.

JUNE 17.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-three members present.

Laws of Sex in Juglans nigra.—Mr. THOMAS MEEHAN said he had at various times during the past few years called the attention of the Academy to specimens of numerous plants which illustrated the principle that sex in plants was the result of grades of vitality; or, as it had been suggested, viability; and that this power of life was a mere matter of nutrition; the highest grades of vitality only producing the female sex. Almost any monœcious plants furnished the necessary evidence of the truth of this position, and what he had said or written on the subject had always been done more to direct attention, and to lead others to examine plants themselves, than that the facts were exhausted. He believed that in the main the principle had been so generally accepted by naturalists, that it seemed unnecessary for him to say any more on the subject, but let it now work its own way. At the meeting of the American Association, at Dubuque, last year, which he had not the pleasure of attending, the subject was introduced; and though, as he gathered from the public papers, the principle was to a certain extent admitted, objection was made that possibly the weakened shoot or axis bearing male flowers was a *result* of the production, and if so it would show rather a great expenditure of vital force in their formation, than afford a proof of the principle under discussion. He was astonished at the suggestion at the time, exhibiting as it did, he thought, a careless reading of his papers; as he had stated, and exhibited the facts supporting the statement to the Academy, that, especially in coniferæ, the weakening process had been going on for several seasons prior to the production of male flowers. In the pine and spruce, for instance, he had distinctly stated, that only those branches the most favorably situated to derive the greatest benefit from nutritive forces bore female flowers. These branches in time naturally became shaded by succeeding growths. The partial shade was injurious to perfect nutrition. A few years of these circumstances weakened the branch, *and after being thus weakened*, the male catkins appeared. There were of course other agencies at work besides shade; whatever they were, the result in sex was the same. He did not think

it worth while to reiterate, at the time these objections were made; but concluded to wait till this season, and introduce facts from some plant not already named in connection with that sexual law.

He now exhibited specimens of the common black walnut, *Juglans nigra*, which furnished excellent illustrations of what had been said on other occasions. Examining the tree at the flowering season, it would be plainly seen by even a superficial observer that there were three grades of growing buds. The largest buds made the most vigorous shoots. These seemed to be wholly devoted to the increase of the woody system of the tree. Lower down the strong last year shoots, were buds not quite so large. These made shoots less vigorous than the other class, and bore the female flowers on their apices. Below these were numerous small weak buds, which either did not push into growth at all, or when they did bore simply the male catkins. No one who gave this matter any examination with the tree before him, would for a moment entertain the idea that these branches and these buds had been weakened by the effort to produce male flowers. He was fully satisfied that any one who would go out into the woods and fields for their own facts fresh from nature, would be abundantly satisfied that there is not so great expenditure of vital force in the production of male flowers as there is in female flowers, and that all he had advanced on the subject was fully borne out.

JUNE 24.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-six members present.

The following papers were presented for publication:—

"The Pterostichi of the United States." By John L. LeConte, M. D. "Synonymical Remarks upon North American Coleoptera." By John L. LeConte, M.D.

The following gentlemen were elected members:—

E. C. Claghorn, Dr. Henry C. Eckstein, U. S. N., and Wm. H. Rush, M.D.

The following papers were ordered to be published:—

OBSERVATIONS ON NESTS OF SAYORNIS FUSCUS.

BY THOS. G. GENTRY.

It is the commonly received opinion that birds of the same species uniformly build their nests of the same materials and in the same form and situation though they inhabit different climates. This, however, is not invariably the case, as a few observations will show. On the north branch of the Susquehanna, some months since, I procured several nests of our common Phebe bird, *Sayornis fuscus*, Baird, which in size, structure, and materials might be taken as nests of species distinct from the one under consideration. As these nests were found upon the horizontal beams of a wagon-shed they would not seem to require such compactness of structure as when built in more exposed situations.

After a careful examination of several nests from different localities, I find that they are usually circular at the top, with a depth externally, differing but little from the average diameter. By measurement I obtain the following dimensions: Diameter from side to side, $3\frac{1}{2}$ in., depth 3 in.; diameter of cavity within, $2\frac{1}{2}$ in., making the thickness of the lateral walls $\frac{1}{2}$ in.; depth of cavity $1\frac{1}{2}$ in., indicating a thickness at the bottom of $1\frac{1}{2}$ in. These nests are composed of fine roots, grasses, fine mosses, and hairs, which are plastered together, and to the objects upon which they are built, by pellets of mud; within they are lined with soft grasses, lint, hairs, and sometimes with wool and feathers.

Number one of deviation is nearly circular, with an average diameter of 4 in. and a depth of 2 in., being considerably depressed. Diameter of cavity $2\frac{1}{2}$ in., depth 1 in.; thickness of lateral walls $\frac{3}{4}$ in.; at the bottom 1 in. The nest is constructed wholly of the silk of corn, with a few strings and hairs on the inside for a lining; the absence of moss and clay pellets being a noticeable feature of the nest; such ordinarily indispensable materials evidently not being requisite, if the site of the nest affords any criterion of judging.

Number two of these anomalous forms is circular, with a diameter of 5 in., and a depth of $2\frac{1}{2}$ in. on the outside; within $2\frac{1}{2}$ in. in diameter, and 2 in. in depth; lateral walls $1\frac{1}{4}$ in. in thickness; inferior $\frac{1}{2}$ in. The entire nest is composed of the inner

bark of the chestnut, plucked, doubtless, from fence rails, and reduced to very fine strips for the inner part of the nest, and gradually attaining a width of nearly one-fourth of an inch on the exterior.

In an intermediate form between the ordinary form and the first deviation therefrom, I find the diameter 4½ in. externally, depth 2 in.; cavity 2½ in., and depth 1½ in.; lateral walls each 1 in.; inferior ½ in. This nest is formed of fine grasses, hair, wool, and an abundance of moss externally; within it is lined by fine grasses and hairs; the absence of clay would seem to imply an unexposed place for its site, to which theory the looseness of its structure most assuredly adds weight.

That a species which has always been known to build a nest so characteristic as the pewee should deviate so considerably, and suddenly, as it seems to be, from its ordinary habit of nest-building, is remarkable. But such is the fact, as the mother-bird was discovered in the act of incubation. It has been suggested that possibly these nests were stolen property, and not the work of the bird in question. But this I am satisfied is not the case. The individuals of some species do take forcible possession of the abodes of others, or the cavities in which such are secreted, but I have never known the intruders to occupy the same, except in the case of *Molothrus pecoris*, Seo., of America, and *Cuculus canorus* of England. As these birds never build, but deposit their eggs in the nests of other birds, I am hardly disposed to grant the propriety of considering them in this light. It is well known that *Troglodytes ædon*, of Verrill, does, when prompted by a mischievous spirit, drive away *Icterus Baltimore*, Daud., and *Sayornis fuscus*, Baird, from their rightful property, and take up *her* abode therein, but not without having previously constructed her rude nest of coarse sticks, well lined with feathers and down.

So strong is the attachment of birds to the nests of their own construction, that the parental instinct is often lost sight of. Proofs could be cited to sustain this assertion. One, however, will suffice. Two years ago in Atlantic County, New Jersey, I came across a nest of the robin, which on account of its curious arrangement, I desired to possess. Unable to wait until the unfledged brood had taken their departure, I conceived the plan of removing them to another nest of the same species, not so neatly

constructed and tastefully arranged. But, as I had anticipated, the mother deserted her offspring; the love for home predominating over every other feeling.

These deviations from the usual style of nest building by the pewee would seem to argue against the belief generally entertained, that instinct, being a positive determination given to the minds of animals for certain purposes, must necessarily be perfect, when viewed in connection with those purposes; but to say that they doubtless imply a *change of instinct* is to perplex the understanding by a perversion of language. But to ascribe these changes to the operations of reason influenced by motives, does seem to be the most rational view to take of the subject. That reason does enter into the inferior creatures, and dictate many of the changes of habit which mark their career, has been shown in many instances; but I cannot forbear to record one which came under my observation in the spring of 1871. While watching a pair of *Ampelis cedrorum*, Baird, engaged in the building of a nest on a branch of an apple tree, it occurred to me, that by supplying them with materials I might secure a nest neater and more compact than those usually made. The birds entered into the project with readiness, and carried away every piece of colored string and cotton fabric with which I supplied them. After I had ceased to furnish the materials they would fly repeatedly to the branch where the articles were deposited, as if imploring my services. The result was a nest firmer, more symmetrical, and more elegant in proportions than any I had ever observed. If instinct had been the controlling principle in this case, the birds would not have given my labors so much attention; but admitting that they had been actuated by reasoning faculties in their selection, the whole thing is perfectly plausible. Instinct is always the same thing; it never advances, never retrogrades; but reason tends to improvement, when it can serve a good purpose.

As the nests which form the subject-matter of this paper were found within a short distance of each other, it would seem that circumstances peculiar to the neighborhood had rendered a deviation from the common form necessary. Observation teaches us that when danger or any other circumstance renders a change in the character of the nest necessary, that deviation is made in an equal degree and in the same manner by all the birds of one species, and that it does not extend beyond the limits of the region where alone it can serve a good purpose.

DESCRIPTIONS OF NEW SPECIES OF ORTHOPTERA COLLECTED IN NEVADA, UTAH, AND ARIZONA, BY THE EXPEDITION UNDER LIEUT. GEO. M. WHEELER.

BY CYRUS THOMAS, PH.D.

WASHINGTON, D. C., May 9th, 1873.

LIEUT. GEO. M. WHEELER, *Dear Sir:* Among the *Orthoptera* collected by your expedition in Nevada, Utah, and Arizona, I find several new and interesting species, and especially the two following, of which I send the descriptions, that you may have them published at as early a day as possible.

Yours very respectfully,

(Signed) CYRUS THOMAS.

ACRIDIDÆ.

ŒDIPODINI.

PEDIOSCERTETES, gen. nov.

Back of the head ascending; vertex rises in front of the eyes in the form of a triangular pyramid; frontal costa distinct above the ocellus, fading below; face sub-oblique. Pronotum regularly expanding posteriorly; sub-tricarinate, the front lobes being rounded, so that the lateral carinæ are indistinct; the median carina wanting, or but a minute line; front margin truncate, hind margin rounded; the three transverse impressions distinct, but not profound. Elytra and wings present. Posterior femora slender; first joint of the posterior tarsi as long as the other two. Metasternum broad; the prosternum narrow, unspined, and without any tubercle. Seen from above tapers considerably from the metathorax to the head, which is quite narrow, but elongate perpendicularly.

This resembles in general appearance *Acrolophitus*, to which it is closely allied, but from which it differs in wanting the crest on the pronotum, and in having the posterior margin of the pronotum rounded.

P. NEVADENSIS, sp. nov.

The tip of the vertex separated from the portion between the eyes by a curved sulcus, which runs from the upper canthus of one eye to that of the other; this portion of the vertex is obliquely ascending and triangular; there are no median or lateral foveolæ. Frontal costa prominent and narrow between the eyes,

and slightly sulcate; the portion below the ocellus indistinct, a little broader than that above, expanding below and slightly sulcate; lateral carinæ indistinct, parallel; face somewhat oblique, narrow. Eyes oblong, ovate, oblique. Antennæ extending about one-fourth their length beyond the pronotum, robust, very slightly depressed, and apparently enlarged toward the apex. Front lobes of the pronotum rounded, sub-cylindrical; lateral carinæ obsolete on the front lobes, obtuse on the posterior lobe; median carina is but an indistinct line; three transverse incisions distinct, but not profound, the posterior one situated a little behind the middle; the posterior border is regularly rounded, nearly semi-circular; the posterior lateral margin curves inward but makes no angle; the posterior lobe is distinctly broader than the head.

Elytra of moderate width; wings rather narrow, both extend slightly beyond the abdomen. The abdomen is enlarged and deep at the base; the valves of the ovipositor slender and acute. The posterior femora are quite slender, being but slightly enlarged at base; posterior tibiæ cylindrical. The body and legs more or less covered by small hairs.

Color (after immersion in alcohol).—Dull greenish-yellow, showing the original color to have been green, probably light pea-green, which is almost entirely uniform on the head, thorax, elytra, and legs, without spots. The antennæ are dusky at the tips. There is a slight rufous tinge on the posterior lobe of the pronotum, and base of the elytra; the apical portion of the latter is translucent; wings pale yellow at base—probably greenish-yellow in the living individual—with a moderately broad fuscous band across the disk, apex transparent with dark nerves. Spines of the posterior tibiæ yellowish, very slightly or not at all tipped with black.

Dimensions.—♀ Length 1.25 in.; elytra .80 in.; posterior femora .60 in.; posterior tibiæ .65 in.; pronotum .25 in.

ACRIDINI.

ACRIDIUM.

A. SHOSHONE, sp. nov.

Large size; color, green without a dorsal stripe.

Female. Vertex nearly horizontal, distinctly hexagonal, suddenly and angularly expanding in front of the eyes, flat. Frontal costa prominent, sides parallel, sulcate, from the ocellus down-

ward, above this somewhat gibbous and punctured; lateral carinæ very prominent, parallel. Pronotum slightly expanding posteriorly; coarsely and reticulately punctured; median carina distinct, severed by the three transverse incisions. Elytra and wings passing the abdomen. Cerci very short, broad at base, narrowed, and rounded at the tip. Posterior femora much enlarged at the base; posterior tibiæ considerably enlarged at the apex. Prosternal spine robust, cylindrical, and nearly straight. Pectus punctured.

Color.—Dark green. Ocelli transparent amber; eyes brown; cheeks yellowish with a dark green stripe extending downward from the eyes. The pronotum has some paler spots on the sides, and sometimes the posterior lobe is tinged with brown. Elytra of a uniform green, semi-transparent toward the apex, and sometimes faintly tinged with brown; wings hyaline, nerves and nervules dark brown. Posterior femora greenish above and below, rays of the disk alternately white and green, the white rays being the flat interspaces of the chevron; internal face greenish-yellow. Posterior tibiæ bright vermilion, the under surface being striped with yellow; spines yellow at base, tipped with black. Venter and pectus dark green, sometimes varied with dark brown.

Dimensions.—Length 2 to 2.5 in.; elytra 1.7 to 2. in.; posterior femora 1.25 in.; posterior tibiæ 1.2 in.

This fine species is very closely allied to *A. emarginatum*, Uhler, but differs from it in the following particulars. It has no dorsal stripe; the elytra are green or greenish instead of brownish-red; the hind femora do not have the black points on the upper margin of the disk; it does not have the black dots on the ventral segments; it is also a larger and more robust species, being one of the largest of this genus found in the United States. I should also state that the cerci of the male, though broad as usual with the section of the genus to which this belongs, instead of extending horizontally along the sides, are curved over the apex; and the sub-anal plate is more than usually elongate, with the apical notch slightly rounded.

The collection was made chiefly by Dr. Yarrow, who informs me that the specimens are mostly from southeast Nevada and southwest Utah. There are some other interesting and new species in the collection, which will be described in Lieut. Wheeler's report of his explorations.

OBSERVATIONS ON THE HABITS OF THE NEUTERS OF FORMICA SANGUINEA.

BY THOMAS G. GENTRY.

A few days ago, while engaged in the collection of Coleoptera underneath stones and decayed logs, my attention was attracted by a nest of *Formica sanguinea*. Scattered over the ground to receive the warmth of the sun, were numberless larvæ of the ant, in diverse stages of development. Some had apparently just escaped from the ova, while others were nearly ready to pass into the condition of pupæ.

Two external apertures of the nest were all that could be discerned leading to chambers below. Many neuters—working ants—were observed performing the duties of nurses to the offspring. On close examination they appeared to be divided into two classes: one having the exclusive charge of the almost mature larvæ; the other, the care of the more feeble.

As is customary with ants in an invasion of their territories, the larvæ were removed to places of security. The larger grubs were conveyed to a separate apartment by workers whose special duty it seemed to be; while the less vigorous were taken possession of by another set, and hidden away in another chamber of the habitation. After the last individual of the former had been cared for, I expected to see the first set come out and assist in the removal of their more tender offspring, that were still lying profusely about. But I was disappointed. With a view to test my observations, I dropped several of these last into the mouth of the first passage-way, thinking that possibly the sight of these would stimulate them to further exertions. But all my attempts to draw them out were in vain. These larvæ remained where I had placed them, until their own properly constituted nurses observed them, when they were immediately seized and carried to appropriate quarters.

After the tumult had subsided, I opened the horizontal channel that led to the first chamber. It was about two inches in length and half an inch beneath the surface. Here, packed away in a commodious chamber, were a score or more of ants, each with the object of its solicitude by its side.

Alarmed still more by this second intrusion, each seized a larva, studiously avoiding the entrance to the main chamber, and hurried it away to places of security among the adjoining leaves and grasses. I am confident that the main nest was shunned, as the parties passed within an eighth of an inch of it, and could readily have entered, had there been any such intention.

The conclusions I have to draw from these facts are the following: 1st. The colony is divided into two sets of neuters, one whose care it is to provide for the wants and security of the abler and more mature, the other to look after the more helpless. 2d. That the more vigorous are necessarily confined to superficial cavities, since they need less care and attention, and in order to avoid the time and trouble of constant removals in consequence of the varied conditions of weather and surrounding circumstances to which they are subjected, said removals seeming to be impracticable in view of the weight and size of the fully-grown larvæ. 3d. That the young and tender are conveyed to deeper-seated chambers, less likely to be assailed by an enemy, thus affording a better means of continuing the species.

JULY 1.

The President, Dr. RUSCHENBERGER, in the chair.

Sixteen members present.

Sex in Rhus cotinus.—Mr. THOMAS MEEHAN said *Rhus cotinus*, the common mist tree, was described as having perfect flowers. In a large quantity of seedlings growing on his grounds he found they were diœcious. There was not much novelty in this, as it was now generally conceded that most if not all plants called by old botanists polygamous, were practically *diœcious*, for what appeared to be perfect flowers had either the male or female flowers entirely inoperative. But in this case the distinction had a practical value to ornamental planters, for he had found that except in very rare instances only the female plants produced the hairy pedicles known as mist. Occasionally a male panicle of extra viability would produce a few short hairs. In general the panicle of male flowers died away as soon as the flowers faded. This fact also illustrated his view of the relative viability of the sexes. One might say of this, as has been said of other illustrations, that of course things die when their work is done. The male having nothing more to do does not need so much vitality as the female, which has to live on, as it has much more work to do. But this reasoning he thought favors his own views, and seems so unanswerable, that it ought, years ago, to have suggested to some mind the true law of vitality in its relation to sex as it had done to his own. It was enough for him that his facts were self-evident, that there was not as much force spent on the production of male as of female flowers.

In the production of seed in Rhus cotinus, he also noted that often two carpels were fully developed, and in some few cases three, thus forming a three-celled capsule.

JULY 8.

The President, Dr. RUSCHENBERGER, in the chair.

Seventeen members present.

Mr. Gentry made the following remarks:—

In some genera of Composite plants with ligulate ray and tubular disk florets, the discoid type has been occasionally observed in abnormal developments. A case of the kind came under my notice recently, while examining a plant of *Rudbeckia hirta*, in which the ray florets were all tubular. The structure of

each corolla was found to be identical with those of the disk, differing immaterially in size and color. Fully one-half of these irregular forms were perfect and fertile, whilst the opposite condition of affairs prevails in the normal flower.

On the same day in which the preceding observations were made, I noticed other plants of the same species, in which the disk florets had grown to twice the usual magnitude, and had doffed their natural shade of brown for the beautiful golden hue so eminently characteristic of the outer circle of florets. Here the essential organs of reproduction had, in a measure, aborted. Upon the principle that excess of growth force has transformed the sterile ray into fertile florets, and the same deficiency has been instrumental in reducing the fertile disk florets alluded to, to a partial state of abortion—a principle so ably maintained in the writings of Mr. Thomas Meehan—the foregoing facts receive a clear and comprehensive solution.

Subsequently I was so fortunate as to find three specimens of fully developed flowers growing upon the same plant, in each of which there was a double series of ray florets having the regular number of florets in each series. These were without exception ligulate and neutral. These secondary series, I think, are the result of the want of vigor necessary to develop fertile florets.

JULY 15.

The President, Dr. RUSCHENBERGER, in the chair.

Twelve members present.

JULY 22.

The President, Dr. RUSCHENBERGER, in the chair.

Eight members present.

The following paper was presented for publication:—

"Descriptions of New Species of Shells from the West Coast of Florida." By R. E. C. STEARNS.

The death of John Warner was announced.

JULY 27.

The President, Dr. RUSCHENBERGER, in the chair.

Eight members present.

On report of the Committee the following papers were ordered to be published:—

THE PTEROSTICHI OF THE UNITED STATES.

BY JOHN L. LECONTE, M.D.

Since the publication of my synopsis of the species of *Pterostichus* and allied genera inhabiting temperate North America,[1] the additions to our fauna have been quite appreciable, but what is of greater importance, by the kindness of friends in Europe, authentic specimens have been procured of most of the species which at that time were unknown to me. It has, therefore, appeared to me useful to place in a condensed form the results of a more recent study of the species in my collection, in order to facilitate the recognition of the numerous forms in this somewhat difficult genus.

I have, with greater material and more careful study, been obliged to modify the generic table given in the work just cited, to such an extent as to place *Pœcilus* as a minor group of *Pterostichus*, and to elevate *Piesmus*, on account of its absolutely simple mentum tooth, to the rank of a genus.

I would, therefore, propose this new scheme of arrangement.

Mandibles striate; elytra with one dorsal puncture.	EVARTHRUS.
Mandibles not striate:	
Mentum tooth emarginate:	
Ligula carinate:	
Metathoracic episterna long.	LOPHOGLOSSUS.
Metathoracic episterna short.	HOLCIOPHORUS.
Ligula not carinate:	
Front tarsi of ♂ normally dilated.	PTEROSTICHUS.
Front tarsi of ♂ obliquely dilated.	LOXANDRUS.
Mentum tooth entire, rounded at tip.	PIESMUS.

It is worthy of remark, that while in Europe many species occur in which the last ventral segment of the ♂ is crested or impressed, four have thus far been found in America. On the Pacific slope *Holciophorus ater* is the only example, and in the higher parts of the Alleghanies *P. mancus*, *diligendus*, and *lubricus*.

[1] Journal Acad. Nat. Sci., Philada., 2d, ii. 225. (1852.)

PTEROSTICHUS.

Division 1. Dorsal punctures wanting; marginal stria single.

A. Posterior tarsi stout, not grooved on the outer side; epistoma and labrum emarginate; prosternum feebly margined behind.

HAMMATOMERUS Chaud.

Joints of hind and middle tarsi ♂ ♀ inflated at tip.

1. *morionides* Chaud.

Joints of hind and middle tarsi ♂ ♀ normal. 2. *tarsalis* n. sp.

B. Posterior tarsi slender, first joint with two grooves and an intervening ridge on the outer side; prosternum (except in *P. planctus*) strongly margined behind; base of prothorax margined towards the sides.

* *A.* Sides of prothorax crenato-dentate:

Prothorax feebly narrowed behind, basal foveæ large, bistriate, elytra opaque, deeply striate. 3. *crenicollis* n. sp.

* *B.* Sides of prothorax entire, not serrate:

a. Prosternum scarcely margined behind:

Outer basal stria of prothorax distinct, humeri not dentiform.

4. *planctus* Lec.

b. Prosternum distinctly margined behind:

a. Prothorax feebly narrowed behind, and slightly sinuate on the sides, hind angles rectangular;

* Humeral angles dentiform:

Hind angles of prothorax distinctly carinate, outer basal stria long.

5. *herculaneus* Mann.

** Humeral angles not dentiform; sides of elytra more rounded near the base:

Base of prothorax not depressed near the angles, outer stria a feebly impressed fovea; *algidus* Lec. 6. *validus* Dej.

Base of prothorax flattened, more narrowed, outer stria short, feeble, general form more elongate; *inornatus* Bland. 7. *protractus* Lec.

Base of prothorax less flattened; outer stria vague or wanting, sides of prothorax oblique, scarcely sinuate behind; sides of elytra more parallel than in *validus;*

Scutellar stria distinct (as in the other species of the group); *californicus* ‡ Lec. 8. *vicinus* Mann.

Scutellar stria very short; form narrower. 9. *longulus* n. sp.

b. Prothorax scarcely narrowed behind, outer basal impression very short, humeri not dentiform, body small, narrow, sides of elytra parallel; *linearis* Lec. 10. *angustus* Dej.

c. Prothorax a little more narrowed behind, flattened at the base, sides scarcely subsinuate, hind angles rectangular, feebly explanate, inner basal stria long, outer one nearly obsolete; humeri dentiform:

* Scutellar stria short:

Elytra with a purple reflection. 11. *amethystinus* Dej.

Elytra piceous or brownish-black; *brunneus* Dej. 12. *castaneus* Dej.

** Scutellar stria long, color black. 13. *scutellaris* n. sp.

C. Hind tarsi slender; prosternum margined at tip; prothorax with inner basal stria distinct, outer one wanting.

a. Base of prothorax margined towards the sides; humeral angles not dentiform, elytra parallel, sides but little rounded near the base; posterior tarsi with obsolete groove on outer side:

Elytral striæ rather fine, interspaces flat, prothorax rather convex, slightly wider than long, rounded on the sides, and not sinuate, base not narrower than tip; *amplicollis* Motsch, *simplex* Lec., *muticus* Lec. 14. *californicus* Dej.

b. Base of prothorax not at all margined:

a Posterior tarsi not grooved on the outer side; body less elongate:

Large, prothorax rather flat at base, and feebly narrowed behind, but scarcely sinuate on the sides, elytra not wider than prothorax, striæ fine, interspaces flat, not shining. 15. *Menetriesii* Motsch.

b First joint of posterior tarsi with two grooves and an intervening ridge: body elongate, slender, the prothorax being narrower than the elytra, and more narrowed behind:

* Scutellar stria long, (♂ with one, ♀ with two anal punctures each side, as usual):

Prothorax less narrowed behind, elytra more parallel; *contractus* Lec. 16. *castanipes* Mén.

Prothorax more narrowed behind, elytra elongate oval:

Hind angles rectangular:

Tarsal grooves extending on the second joint. 17. *Spraguei* n. sp.

Tarsal grooves only on first joint; *longicollis* ‖ Motsch. 18. *gracilior* Lec.

Hind angles obtuse rounded at tip. 19. *Hornii* n. sp.

** Scutellar stria short, elytra elongate oval, deeply striate; (♂ ♀ with two anal punctures each side.)

Prothorax as wide as long, less narrowed behind, and sides less sinuate. 20. *Isabellæ* Lec.

Prothorax longer than wide, more narrowed and sinuate behind; *illustris* Lec. 21. *congestus* Mén.

D. Posterior tarsi slender, with the usual double groove and intervening ridge on the first joint, prosternum not margined at tip; head of usual size, prothorax narrowed behind, basal impressions linear, single.

a. Hind angles of prothorax rectangular; base not margined;

Tarsal grooves extending on the second joint, elytral striæ deep, humeri dentiform; *tristis* Dej., *interfector* Newm., *sustentus* Lec., *subarcuatus* Lec., *rejectus* Lec. 22. *adoxus* Say.

b. Hind angles of prothorax very small rectangular, base margined; *oregonus* ‖ Chaud. 23. *longicollis* Lec.

c. Hind angles of prothorax obtuse rounded. 24. *sphodrinus* Lec.

s´E. Posterior tarsi slender, without marginal grooves, prosternum not margined at tip; head very large, hind trochanters very long; prothorax quadrate, moderately narrowed behind, angles rectangular, base broadly foveate each side, not margined, outer stria distinct, with a slight carina.

Hind angles of prothorax more prominent, hind trochanters acute at tip. 25. *grandiceps* Chaud.

Hind angles of prothorax less prominent, hind trochanters rounded at tip; *grandiceps* Lec. 26. *rostratus* Newm.

Division 2. One dorsal puncture on the third stria, behind the middle; scutellar stria very short; prosternum not margined behind.

A. Prothorax narrowed behind, hind angles subobtuse, basal striæ two, the outer one shorter:

Outer basal stria distinct, with a feeble carina: last ventral segment ♂ with a small tubercle near the tip. 27. *mancus* Lec.

Outer basal stria punctiform, without carina: last ventral segment ♂ with a broad apical impression. 28. *diligendus* Chaud.

B. Prothorax narrowed behind and sinuate on the sides, basal angles rectangular prominent, impressions linear deep, punctulate; elytra more broadly oval; *fastiditus* Dej., *Stomis americana* Lap. 29. *honestus* Say.

Division 3. Elytra with several dorsal punctures; palpi with the last joint cylindrical, truncate.

Episterna of metathorax short:

Prosternum not margined behind;

Outer striæ of elytra finer; dorsal punctures 3:

Scutellar stria long. A.

Scutellar stria short. B.

Elytral striæ equally deep:

Prothorax narrowed behind, basal foveæ large: C.

Prothorax wider behind, basal foveæ double, narrow; dorsal punctures 3; ABACIDUS Lec. D.

Prosternum margined behind; prothorax wider behind, basal foveæ double, dorsal punctures 3; PERISTETHUS Lec. E.

Episterna of metathorax long:

Prosternum margined behind:

Scutellar stria long, elytra sinuate at tip; POECILUS. F.

Prosternum not margined behind; (scutellar stria long and elytra strongly sinuate at tip);

Prothorax with basal foveæ bistriate, and hind angles carinate; dorsal punctures 3; OMASEUS. G.

Prothorax with linear basal foveæ, hind angles not carinate:

Dorsal punctures 3; (hind tibiæ of ♂ usually hairy on inner side); DYSIDIUS Chaud. H.

Dorsal foveæ 5–6; PLATYSMA. I.

A.

(Prothorax finely margined; two joints of hind and middle tarsi grooved on outer side: last ventral ♂ with a short high carina acute at tip).

Prothorax with linear basal impressions, narrowed behind, hind angles rectangular, elytral striæ very fine, scutellar long, but not well defined. 30. *lubricus* Lec.

B.

(Prothorax finely margined; tarsi not grooved on the outer side; prothorax much rounded on the sides, with short narrow basal impressions; sides of abdomen punctured:)

Hind angles of prothorax obtuse not rounded, striæ of elytra punctured, form stouter. 31. *tumescens* Lec.

Hind angles of prothorax obtuse and rounded, form less stout:

Elytral striæ not punctured. 32. *obscurus* Say.

Elytral striæ punctured; *cyclodorus* Chaud. 33. *ventralis* Say.

C.

(Prothorax strongly margined; two or three joints of posterior tarsi grooved on the outer side:)

a. Dorsal punctures 2:

Basal foveæ of prothorax linear, deep. 34. *lachrymosus* Nm.

Basal foveæ large:

Hind angles carinate: more or less rounded;

Foveæ without tubercle, *mœrens* Newm., *adjunctus* Lec., *flebilis* Lec. 35. *coracinus* Newm.

Foveæ with tubercle; *bisigillatus* Harris, *rugicollis* Hald. 36. *stygicus* Say.[1]

Hind angles not carinate, foveæ without tubercle; *protensus* Lec.[2] 37. *relictus* Newm.

b. Dorsal punctures 4, hind angles of prothorax broadly rounded, basal foveæ large and deep;

Hind angles carinate, color purple, shining. 38. *superciliosus* Say.

Hind angles not carinate, color dull, nearly black. 39. *mœstus* Say.

c. Alternate interspaces interrupted by irregular lines and punctures. 40. *punctatissimus* Rand.

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[1] The type of *F. picipes* Newm. in the British Museum belongs to this species, but the description does not agree, and seems to refer rather to *Piesmus submarginatus*; there seems to have been some confusion of labels.

[2] The type of *F. relicta* Newn. in the British Museum belongs to this species; the description mentions six elytral punctures, three on each, an anomaly which exists in fact in the specimen.

D.

(Tarsi without grooves; body oval:)
Hind angles rectangular, scutellar stria long:
Basal foveæ and side margin of prothorax not punctured; body wider. 41. *fallax* Dej.
Basal foveæ and side margins punctured; body less wide; *striatus* Dej. 42. *sculptus* Lec.
Hind angles rounded, scutellar stria wanting:
Side margin much wider, impunctured. 43. *obesulus* n. sp.

E.

(Two joints of posterior tarsi finely grooved on outer side, body oval:)
Basal foveæ and side margin of prothorax feebly punctured. 44. *permundus* Say.

F.

(Antennæ with joints 1–3 strongly carinate; two or three joints of posterior tarsi grooved on the outer side; basal foveæ of prothorax double.)
a. Sides of prothorax not depressed:
* Prothorax distinctly narrowed behind, sides feebly sinuate:
Body impunctured beneath; outer basal fovea punctiform, feeble;
Larger, elytral striæ punctured, dorsal punctures 3. 45. *subcordatus* Lec.
Smaller, elytral striæ not punctured, dorsal punctures 2. 46. *scitulus* Lec.
Meso- and metathorax punctured beneath:
Outer basal foveæ larger, prothorax less narrowed behind, but more sinuate on the sides, dorsal punctures 2; *occidentalis* ‡ Chaud. 47. *lætulus* Lec.
** Prothorax very slightly narrowed behind, feebly or not at all sinuate on the sides: basal foveæ confluent, punctured:
Color dark metallic; hind angles of prothorax nearly rectangular, dorsal punctures 2–4; *cursitor* Lec. 48. *occidentalis* Dej.
Color black, hind angles nearly rectangular, dorsal punctures 2–4. Long. 12 mill.; Dacota. 49. *corvus* n. sp.
*** Prothorax feebly narrowed behind, basal foveæ not confluent, outer one small but deep, dorsal punctures 2; body beneath impunctured;
Prothorax as much narrowed before as behind; basal foveæ not punctured. 50. *cyaneus* Lec.
Prothorax more narrowed in front;
Antennæ piceous at base. 51. *texanus* Lec.
Antennæ ferruginous at base; *chalcites* ‖ Say. 52. *Sayi* Brullé.
b. Prothorax not narrowed behind, sides depressed, more widely towards the base: trunk punctured beneath;
Not polished, dorsal punctures 4:
Outer basal fovea distinct, color green or blue, or dull bronze, legs piceous or ferruginous. 53. *lucublandus* Say.

Outer basal fovea wanting, color blue, legs ferruginous. 54. *bicolor* Lec.

More convex and shining, dorsal punctures 3; feebly bronzed, legs piceous or ferruginous. 55. *convexicollis* Say.

G.

(Prothorax more or less narrowed behind, basal angles carinate, foveæ large and deep, bistriate, punctulate; elytra with 3 dorsal punctures, and long scutellar stria, sinuate near the tip, humeri dentiform; posterior tarsi with first joint feebly grooved on the outer side.)

Prothorax strongly narrowed behind, angles rectangular prominent:

Larger, very shining, basal foveæ impunctured, elytra iridescent, striæ fine. 56. *acutangulus* Chaud.

Smaller, basal foveæ punctulate, elytra more deeply striate; *nigrita* ‡ Kirby, *agrestis* Bland. 57. *caudicalis* (Say).

Prothorax less narrowed behind, angles small rectangular, slightly prominent; basal foveæ punctured; elytral striæ deep:

Still smaller, slender; *abjectus* Lec. 58. *luctuosus* Dej.

Broader and larger; *tenebrosus* Chaud. 59. *corvinus* Dej.

H.

(Posterior tarsi with 2 or 3 joints grooved on the outer side; prothorax moderately narrowed behind, angles not prominent, basal foveæ linear deep; elytra with three dorsal punctures, scutellar stria long, humeral angles not dentiform, tip sinuate.)

a. ♂ with inner side of hind tibiæ clothed with hair; 3 tarsal joints grooved;

Color purplish, basal impressions of prothorax not punctured, hind angles rather obtuse. 60. *purpuratus* Lec.

Color black, basal impressions of prothorax more or less punctured, angles small rectangular; *morosus* Dej., *picicornis* Kirby. 61. *mutus* Say.

b. ♂ with the hind tibiæ not hairy on the inner side; tarsal grooves less deep, not extending to the third joint;

Prothorax feebly sinuate on the sides behind, hind angles rectangular, basal foveæ feebly punctured. 62. *lustrans* Lec.

I.

(Posterior tarsi with 3 joints grooved, though sometimes not very deeply; prothorax with basal impressions linear, more or less punctured, angles rectangular or obtuse not rounded; elytra with 5 or 6 large dorsal punctures, humeri not dentiform, tip deeply sinuate, scutellar stria long. Species indefinite and opinionative, especially in the differences between *orinomum* and *Luczotii*.)

a. Elytra in both sexes shining:

Hind angles of prothorax small, prominent, dentiform. 63. *pensylvanicus* n. sp.

b. Elytra of ♀ dull, of ♂ shining:

Sides of prothorax more broadly depressed:

Sides of prothorax slightly sinuate behind, angles rectangular. 64. *vitreus* Dej.

Sides of prothorax oblique; angles obtuse; *adstricta* Dej., *oblongiuscula* Motsch., *obtusangula* Motsch. 65. *orinomum* Lec.

Sides of prothorax more narrowly depressed:

Sides of prothorax oblique, angles obtuse; *6-punctatus* Mann, *seriepunctatus* Mann. 66. *Luczotii* Dej.

Larger, prothorax more narrowly margined, sides slightly sinuate behind, angles rectangular; *colligatus* Walker. 67. *oregonus* Lec.

Division 4. Elytra with dorsal punctures; palpi with the last joint elongate oval, scarcely truncate. (Small species.)

Prosternum finely margined behind:

Episterna of metathorax elongate:

Scutellar stria wanting:

Prothorax rounded, broadly margined; dorsal punctures 3. A.

Prothorax narrowed behind, finely margined; dorsal punctures 2. B.

Scutellar stria long; dorsal punctures 3; ARGUTOR. C.

Episterna of metathorax short, dorsal punctures 4–6:

Scutellar stria variable; CRYOBIUS. D.

A.

(Posterior tarsi with 4 joints grooved on the outer side. Body oval elongate, head rather small, prothorax nearly square with very rounded angles, sides widely depressed towards the base, basal impressions single deep, impunctured.)

Shining black, antennæ, palpi, and legs ferruginous; *Platyderus nitidus* Kirby. 68. *erythropus* Dej.

B.

(Posterior tarsi with 2 joints grooved on the outer side. Body of usual form, prothorax narrowed slightly behind, angles obtuse not rounded, basal impressions double, outer one punctiform; scutellar stria punctiform, dorsal punctures 2; prosternum margined at tip.)

Bronzed, antennæ, palpi, and legs ferruginous. 69. *splendidulus* Lec.

C.

(Posterior tarsi with three joints grooved on the outer side; prothorax feebly narrowed behind, angles not rounded, basal impressions single, base finely margined each side.

Elytral striæ impunctured; hind angles of prothorax subrectangular, slightly prominent, antennæ and legs dark ferruginous. 70. *patruelis* Dej.

Elytral striæ punctured as far as the middle; form less slender, hind angles more distinctly obtuse; antennæ and legs dark ferruginous, thighs usually piceous. α. Striæ strongly punctured; *desidiosus* Lec. β. Striæ indistinctly punctured. 71. *femoralis* Kirby.

Smaller, very shining, iridescent, elytral striæ obsoletely punctured; hind angles of prothorax obtuse not prominent, antennæ and feet bright ferruginous. 72. *corrusculus* n. sp.

D.

(Posterior tarsi with 3 joints grooved on the outer side; body elongate, prothorax moderately narrowed behind, basal angles subrectangular, occasionally prominent, impressions single or double, in the latter case the angles are sometimes feebly carinated; elytra elongate oval, or subovate, usually convex, dorsal punctures 2–6, but not very constant; humeral angles rounded, tip more or less sinuate, scutellar stria sometimes long, sometimes short, species in part opinionative and indistinct.)

a. Base of prothorax not margined near the hind angles; legs blackish.

* Base of prothorax between fovea and angle convex, or at least not flattened; elytra convex, scutellar stria long, dorsal punctures small:

Brassy, elytral striæ fine, first and second striæ connected behind by a deeper hook: outer basal impression punctiform, indistinct, hind angles nearly obtuse. 73. *vindicatus* Mann.

Elytral striæ deeper:

Black, basal foveæ of prothorax not punctured. 74. *ventricosus* Dej.

Bronzed, basal foveæ punctured. 75. *subexaratus* Mann.

** Base of prothorax between foveæ and angle flattened; elytra convex, scutellar stria, dorsal punctures:

Bronzed, hind angles of prothorax nearly obtuse, outer fovea wanting, inner one punctured. 76. *pinguedineus* Dej.

More brilliant green bronzed, hind angles rectangular. 77. *hyperboreus* Men.

b. Base of prothorax margined near the hind angles; legs usually ferruginous; scutellar stria generally short:

* Outer basal fovea small, but distinct, angles not carinate:

Prothorax more narrowed behind, angles rectangular, sinuosity short. 78. *hudsonicus* Lec.

Like preceding, but smaller, less convex, sides of prothorax more sinuate, though less narrowed behind; *quadricollis* Mann. 79. *similis* Mén.

Broader, and less convex, hind angles prominent, sides of prothorax more sinuate. 80. *fatuus* Mann.

** Outer basal fovea longer, hind angles subcarinate, foveæ confluent, forming a depressed space:

Hind angles slightly prominent, elytral striæ rather deep; *fuscoæneus* Chaud. 81. *riparius* Dej.

Hind angles more prominent, sides more sinuate, elytral striæ finer, especially towards the sides and tip. 82. *confusus* Mann.

** Outer basal fovea wanting, space from angle to fovea generally less flattened (thus resembling the species in (a*) but the base is margined towards the angle, and the feet are ferruginous); elytral punctures strongly marked.

Larger, hind angles of prothorax rectangular, small, and not prominent; 83. *subcaudatus* Mann.

Middle sized, hind angles of prothorax rather prominent. a. Hind angles somewhat less prominent; *frigidus*. 84. *empetricola* Dej.

Smaller, prothorax broader, comparatively more narrowed behind, sides suddenly sinuate, hind angles prominent; *fastidiosus* Mann., *ochoticus* Sahlb. 85. *mandibularis* Kirby.

NEW SPECIES.

2. P. TARSALIS, elongate, very depressed, parallel, black shining; prothorax quadrate, a little wider than long, feebly narrowed behind, front angles acute, apex broadly but deeply emarginate, base subsinuate, margined near the angles, which are rectangular and not carinate, basal impressions feeble, double, the outer one shorter; elytra rather broadly margined, feebly sinuate towards the tip; humeri dentiform, striæ fine but deep, impunctured, scutellar not very long, between first and second striæ; posterior tarsi rather stout, joints triangular, not grooved on the other side. Long. 16.5–19 mm.

Lake Taho Valley, Sierra Nevada. This species has the form and sculpture of *P. planctus* Lec., but is easily known by the labrum and epistoma being broadly emarginate, as in *P. morionides* Chaud., and by the tarsi being much stouter, and not grooved on the outer side. The prosternum is finely margined between the coxæ; the sides of the trunk are finely not deeply punctured; as in other Pterostichi, the last ventral segment of the ♀ is marked with two setigerous punctures, and of the ♂ with but one; in the latter sex there is also a feeble subapical concavity which is wider than long.

3. P. CRENICOLLIS, elongate, black, elytra with a feeble purplish lustre (rather dull in the ♀), prothorax quadrate, scarcely wider than long, feebly narrowed behind, rather depressed, front angles rounded at tip, tip broadly emarginate, base nearly straight, margined near the angles which are rectangular, but not sharp, broadly and feebly subcarinated, basal impressions double, the outer one shorter, sides narrowly margined, and distinctly crenate at the edge; elytra broadly rounded on the sides, distinctly sinuate near the tip, humeri dentiform, striæ deep impunctured, scutellar short,

inside of the first stria; posterior tarsi slender, with the first joint strongly grooved. Long. 17 mm.

Washington Territory and Vancouver; Messrs. Davidson and Matthews. A very distinct species by the finely crenate lateral edge of the prothorax. The ♂ has the usual anal point each side, but the ♀ has *three*, and in one specimen three on one side and four on the other.

9. P. LONGULUS, elongate, shining black, prothorax as wide as long, rounded on the sides, narrowed behind, sides not sinuate, hind angles obtuse not prominent, posterior transverse impression distinct, basal impressions long, linear, outer one wanting, base not depressed near the angles but finely margined; elytra scarcely wider than the prothorax, sides nearly straight, rounded towards the humeri, which are dentiform, striæ well impressed, obsoletely punctured, scutellar stria wanting; posterior tarsi with three joints grooved on the outer side. Long. 11 mm.

Colorado, one pair given me by Dr. S. Lewis. Very nearly allied to *P. vicinus*, but smaller and narrower, with the hind angles of the prothorax not rectangular and prominent, and the scutellar stria absent.

12. P. CASTANEUS (Dej.) I can find no substantial difference between the types of this species and P. brunneus Dej., which were sent me by Baron Chaudoir; in the latter the sides of the prothorax are a little less distinctly flattened towards the base; I also received a specimen of the latter form from Col. Motschulsky, labelled P. *vicinus* Mann., from which it differs obviously by the characters given in the preceding table.

13. P. SCUTELLARIS, elongate, pitchy black shining, prothorax as wide as long, broadly rounded on the sides, moderately narrowed behind, sides feebly sinuate near the hind angles which are rectangular, base depressed each side and finely margined, transverse impressions distinct, basal impressions rather short, outer one wanting, margin slightly explanate near the base; elytra rather flat, parallel, feebly rounded near the humeri which are prominent and dentiform, striæ well impressed, feebly punctured, scutellar long, between the first and second; posterior tarsi with the first joint feebly grooved on the outer side. Long. 9–11 mm.

Two specimens, California, Mr. G. Davidson. Closely related to *P. castaneus*, but easily distinguished by the well-marked scutellar stria. It resembles in form *P. vicinus*, but is known at once

by the depressed base of prothorax, broader lateral margin, sides feebly explanate near the base, and the tarsal grooves feeble and visible on the first joint.

14. P. CALIFORNICUS Dej. An abundant species in California; *P. muticus* and *simplex* Lec. are not different; *Brachystylus amplicollis* Motsch. is a form with the prothorax a little wider and more rounded on the sides.

17. P. SPRAGUEI, very elongate, opaque black (♂); frontal impressions distinct; prothorax longer than wide, rather strongly narrowed behind, rounded and finely margined on the sides, which are feebly (but not shortly) sinuate behind; very broadly emarginate in front, with the angles rounded; base straight, not margined, angles rectangular, basal impressions long, very feeble, posterior transverse impression angulated, dorsal line fine, much abbreviated at each end; elytra elongate oval, a little wider than the prothorax, rounded at base, humeri slightly dentiform, stria fine, impunctured, rather deeper towards the tip, which is feebly sinuate, scutellar long, joined to the 1st stria; posterior tarsi with the 1st and 2d joints grooved, and the 3d more feebly so. Long. 17 mm.

Nevada, a ♂ kindly given me by Mr. P. S. Sprague, to whom I take great pleasure in dedicating it, as a mark of appreciation of his labors in the study of our Carabidæ. Dr. Horn has also received a specimen from the same region. It is as slender in form as *P. longicollis* and *Hornii*, and is easily known by the dull black color.

19. P. HORNII, very elongate, piceous black, shining (♀), frontal foveæ very indistinct, prothorax longer than wide, broadly rounded and finely margined on the sides, rather strongly narrowed behind, scarcely emarginate in front, with the angles not prominent, base straight, not margined towards the angles, which are obtuse and not rounded, basal impressions long but feeble; elytra elongate oval, scarcely wider than the prothorax, rounded at base, humeri slightly dentiform, striæ fine impunctured, rather deeper towards the tip, which is not very strongly sinuate; scutellar between first and second stria rather indistinct, moderately short; posterior tarsi with the first joint with a single feebly marked groove on the outer side. Long. 14 mm.

One female, S. E. Sierras of California, Dr. Horn. Quite distinct from all the allied species by the obtuse hind angles of the

prothorax and the obsolete frontal impressions; otherwise it resembles in form *P. longicollis.*

22. P. ADOXUS Say, *subarcuatus* Lec., *rejectus* Lec., and *sustentus* Lec., are slight modifications of this species, with more or less prominent high angles of the prothorax.

35. P. CORACINUS Newman, varies in a similar manner; *adjunctus* Lec. and *moereus* Newm. (*flebilis* Lec.) are corresponding modifications. I have found the same variations in *P. stygicus* Say, but they have fortunately not received separate names.

43. P. OBESULUS, robust, oval, very shining black (♀), prothorax wider than long, rounded on the sides, which are strongly margined and towards the base widely depressed; base a little wider than the apex, straight, margined towards the hind angles, which are obtuse and slightly rounded, basal foveæ short, deep, marked with a few punctures; elytra scarcely sinuate towards the tip, humeri not dentiform, striæ deep, punctured, scutellar wanting, but indicated by the usual puncture; dorsal punctures 3, the 1st on the 3d, the others on the 2d stria, and less separated than usual; sides of trunk and abdomen punctured; tarsi not grooved. Long. 10 mm.

Georgia. A very remarkable species of which I have seen only the specimen kindly communicated by Dr. Horn.

62. P. LUSTRANS Lec. The specimens of this species from Vancouver Island, Washington Territory, are larger than those from California, but do not otherwise differ.

63. P. PENSYLVANICUS, very shining black in both sexes, prothorax with the side margin a little wider towards the base, hind angles dentiform prominent; elytra with the striæ deep, interspaces slightly convex, 3d with 5 large punctures. Long. 11 mm.

Mountains of Pennsylvania. This species is closely related to the others of the group, and especially to *P. vitreus;* it is, however, rather narrower, more shining in both sexes, and the hind angles of the prothorax are more prominent and dentiform.

69. P. CORRUSCULUS, elongate, shining black, antennæ and legs ferruginous; prothorax a little wider than long, equally narrowed at tip and base, rounded on the sides, hind angles obtuse, not prominent, transverse impressions obsolete, basal impressions long and deep, base finely margined each side; elytra with deep nearly impunctured striæ, scutellar distinct, 3d interspace with 3 dorsal punctures. Long. 5 mm.

Massachusetts. Mr. P. S. Sprague. Smaller and narrower than *P. femoralis*, with the legs entirely ferruginous. In one specimen there is a very faint and small outer basal impression.

70. *Argutor bicolor* Kirby, *ib.* The type agrees with P. PATRUELIS, except that the outer elytral striæ are less impressed, and the basal foveæ of the prothorax less deep. These differences seem to be individual.

73. P. VINDICATUS Mann. As exhibiting the uncertain and opinionative character of the species of the Cryobius group, I will give a list of the specimens upon which I have based the table above printed, and the sources from which they have been derived.

86. *A. brevicornis* Kirby, *ib.* The type seems not distinct from one specimen of *A. mandibularis;* the other specimen of the latter is more elongate, more bronzed, less convex, with the elytral striæ deeper, and dorsal punctures less evident. These differences do not seem to me specific. *P. fastidiosus* Mann. is a smaller and stouter race, with the hind angles of the prothorax less defined, and *P. ochoticus* an equally small and stout race, with the hind angles more prominent.

P. VINDICATUS, 2 spec. Chaudoir, Mnizsech. Kadjak.

P. VENTRICOSUS, 1 spec. Chaudoir. Sitka.

P. SUBEXARATUS, 2 spec. Mnizsech, Maeklin. Unalaska.

P. PINGUEDINEUS, 1 spec. Chaudoir. Sitka, 1 spec. Motsch. (as *ventricosus*).

P. HYPERBOREUS, 1 spec. Mnizsech. Island St. George.

P. HUDSONICUS Lec. 1 spec., Ulke, Hudson's Bay Terr., 3 spec. Sprague, Mount Washington, N. H.; 1 (smaller) Lake Superior; 3 sp. Motschulsky, Alaska. (2 as *pinguedineus*, 1 as *empetricola.*)

P. SIMILIS, 1 spec., Mnizsech. Island St. George; 1 Motschulsky (as *P. quadricollis*).

P. FATUUS, 2 spec. Chaudoir. Sitka.

P. RIPARIUS, 3 spec. Chaudoir. Mnizsech, Sitka, Kadjak, Kenai; and 1 spec. Motschulsky (as *P. fatuus*).

P. CONFUSUS, 2 spec. Ménétriés.

P. SUBCAUDATUS, 2 spec. Chaudoir, Mnizsech.

P. EMPETRICOLA, 1 spec. Chaudoir, Sitka; 2 Hudson Bay Terr.; 1 Motschultsky, Kenai; 2 sp. Motschulsky (1 as *fastidiosus*, 1 as *frigidus?*).

P. MANDIBULARIS, 2 spec., Lake Superior; 2 sp., Fort Simpson; 1 spec. Sprague, White Mountains, N. H.; 1 Ulke, Kenai; 2 spec

smaller and stouter, Chaudoir and Mnizsech (as *P. fastidiosus*); 3 spec. smaller and stouter, with more prominent hind angles, Motschulsky, Siberia (as *P. ochoticus*).

LOPHOGLOSSUS Lec.

Obs. Posterior tarsi obsoletely grooved on the outer side of the first joint; prosternum flattened at tip, but not margined; prothorax strongly margined, basal foveæ deep, hind angles not carinate; elytra feebly sinuate at tip, marginal stria single, scutellar stria long, dorsal punctures three; metathoracic episterna long.

Differs from Pterostichus § 3, G, (Omaseus), chiefly by the prothorax more strongly margined, hind angles not carinate, and by the ligula being obtusely carinated for its whole length; the last character being the only one which for convenience may be assumed to have generic value.

A. Hind angles of prothorax rectangular, sides sinuate towards the base; middle tibiæ of ♂ armed with a subapical tooth on the inner side, more or less distinct, and an apical process.

a. ♂ ♀ not very brilliant, elytra of ♀ dull.

Larger sides of prothorax scarcely sinuate behind; middle tibiæ of ♂ with an acute, apical process, and obsolete subapical tooth. *Haldemani* Lec.

Large, sides of prothorax distinctly sinuate towards the base middle tibiæ of ♂ with an obtuse subapical tooth, and a large acute apical process, *complanata* Dej. *tartaricus* (Say.)

b. ♂ ♀ moderately and equally brilliant; sides of prothorax distinctly sinuate behind; middle tibiæ ♂ with an acute subapical tooth, apical process wanting. *strenuus* Lec.

c. ♂ ♀ very brilliant, as if varnished; sides of prothorax distinctly but less strongly sinuate, middle tibiæ of male with acute subapical tooth and feeble obtuse apical process. *a.* Hind angles of prothorax less prominent, *canadensis* Chaud. *scrutator* Lec.

B. Hind angles of prothorax obtuse, sides more widely reflexed behind; elytra ♂ dull, middle tibiæ without subapical tooth and but feeble apical process. *gravis*, n. sp.

L. gravis, black, moderately shining, elytra (♂) less shining, form and sculpture as in L. tartaricus, except that the sides of the prothorax are simply rounded, not at all sinuate near the hind angles, which are obtuse; the lateral margin is rather more widely reflexed behind. Long. 19 mm.

One ♂ in the collection of Dr. Horn, probably found in Pennsylvania. With the general form and appearance of *L. tartari-*

cus, this species has nearly the sexual characters of *L. Haldemani;* that is to say, the tooth on the inner side of the middle tibiæ of the male is obsolete, and the apical tooth or process is small and acute, though much less developed.

LOXANDRUS Lec.

I have not had access to a sufficient number of specimens to enable me to make a revision of the species of this genus, which seem to be in part at least, indefinite and opinionative.

The following species have not been identified:—

FERONIA CARBONARIA Dej.

F. EBENINA Dej.

BRACHYSTYLUS PARALELLUS Motsch.

BRACHYSTYLUS CURTIPENNIS Motsch.

F. (HYPHERPES) SEJUNGENDA Chaud. Rev. et Mag. Zool. 1868.

F. PRÆTERMISSA Chaud. ibid.

OMASEUS NIGRITA ‡ *Kirby*, Fauna Bor. Am. The type in the British Museum examined by me is larger than P. CAUDICALIS, and differs by the prothorax more narrowed behind, the hind angles smaller, and the two striæ of the basal foveæ not connected by a hooked line.

F. MONEDULA Newm. Ent. Mag. V. 386. Type not in the British Museum; referable probably to CORACINUS Newm.

ARGUTOR LINEARIS Mannh. Bull. Mosc. 1853, 126.

P. RUGULOSUS (Motsch.) Mannh. ibid. 1852, 296; *Steropus rug.* Motsch. ibid. 1845, iv. 342; *Steroderus rug.* Motsch. Käfer Russl. 55.

P. FUSCOÆNEUS Mannh. Bull. Mosc. 1843. 203; *Omaseus fusc.* Chaud. Ann. Ent. Soc. Tr. iv. 448; Chaud. Rev. and Mag. Zool. 1868, = riparius f. Chaud.

OMASEUS RUFISCAPUS Mannh., Bull. Mosc. 1853, 126; *Cryobius ruf.* Chaud. Rev. and Mag. Zool. 1868.

F. (CRYOBIUS) RUFICOLLIS Mannh. ib. 1853, 131; near *empetricolla* fide Chaud. Rev and Mag. Zool. 1868.

F. (C.) ROTUNDICOLLIS Mannh. ibid. 1853, 132.

F. (C.) SUBSINUOSA Chaud. Rev. and Mag. Zool. 1868.

F. (C.) ARCTICOLA Chaud. ibid.

F. (C.) LABRADORENSIS Chaud. ibid.

F. (C.) DIPLOGMA Chaud. ibid.

EVARTHRUS Lec.

Obs. Posterior tarsi not grooved on outer side; prothorax variable; elytra with rounded humeri, and one dorsal puncture, scutellar stria usually short or punctiform, rarely long; metathoracic episterna short; first ventral segment margined at the base; prosternum not margined behind.

A. Prosternum deeply sulcate, emarginate at tip; prothorax quadrate, feebly narrowed and not constricted at base; basal foveæ large and deep, bistriate with a supplementary inner fovea, hind angles carinate; base finely margined each side.

a. Hind angles obtuse, sides not sinuate near the base; marginal striæ approximate:

* Prothorax wider than long, scutellar stria wanting:

Prothorax more widely margined, especially towards the base:

Elytral striæ strongly punctured; ♂ ♀ dull. 1. ***seximpressus*** Lec.

Prothorax more narrowly margined:

Elytral striæ strongly punctured, ♀ dull, ♂ subopaque; ***vidua*** Dej. 2. ***sigillatus*** Say.

Broader, elytral striæ finely punctured, hind angles of prothorax less obtuse, ♀ ♂ subopaque. 3. ***americanus*** Dej.

** Prothorax as long as wide:

Scutellar stria long, hind angles obtuse, somewhat rounded, less strongly carinate; elytral striæ finely punctured, ♂ dull; ***conviva*** Lec. 4. *orbatus* Newm.

b. Sides of prothorax slightly sinuated near the base, hind angles rectangular; scutellar stria wanting:

* Hind angles very small:

Prothorax more widely margined towards the base, elytra ♀ subopaque, marginal striæ approximate. 5. *Engelmanni* Lec.

Prothorax less widely margined; elytra ♀ very dull, marginal striæ less approximate. 6. *nonnitens* n. sp.

** Hind angles more prominent, more strongly carinate:

Elytra ♂ ♀ shining; marginal striæ not approximate. 7. *gravidus* Hald.

B. Prothorax strongly constricted behind, sides suddenly strongly sinuate, hind angles rectangular prominent, carinated, basal foveæ deep, bistriate, base margined each side; prosternum feebly or only obsoletely sulcate.

a. Elytra feebly sinuate at tip, ♀ subopaque;

Very large shining, striæ nearly effaced punctured, scutellar long; hind angles of prothorax very prominent. 8. *heros* Say.

Striæ distinct, punctured, scutellar short:

Hind angles of prothorax very prominent. 9. *colossus* Lec.

Hind angles shorter and less prominent:

Sides of prothorax very much rounded; *fatuus* Lec., *corax* Lec., *orbatus*‡ Lec. 10. ***sodalis*** Lec.

Sides of prothorax more oblique, less rounded. 11. *furtivus* Lec.

b. Elytra strongly sinuate towards the tip:

Large, sides of prothorax very much rounded, basal angles longer, more prominent, more strongly carinated. 12. *Sallei* Lec.

Smaller; (species very indefinite and opinionative):

Anterior transverse impression well defined; hind angles longer, prominent.

Broader, elytral margin stronger, subangulated at the humeri, (elytral striæ sometimes effaced), *lutebrosus* Lec. 13. *substriatus* Lec.

Narrower, elytral margin finer, not angulated, (elytral striæ sometimes partly effaced), *ovipennis* Lec. 14. *constrictus* Say.

Anterior transverse impression feeble, or obsolete, hind angles shorter, though prominent, legs ferruginous, *abdominalis* Lec. *lixa* Lec. 15. *incisus* Lec.

Anterior transverse impression obsolete, hind angles very small, scarcely carinate, outer basal stria punctiform. 16. *vinctus* Lec.

C. Prothorax strongly rounded on the sides and narrowed behind, basal foveæ single, hind angles not carinate, obtuse or very small, and feebly prominent.

a. Prosternum feebly or obsoletely sulcate behind:

* Anterior transverse impression feeble:

Elytra tolerably strongly sinuate towards the tip:

Large, hind angles small, nearly rectangular. 17. *unicolor* Say.

Large, hind angles small obtuse. 18. *rotundatus* Lec.

Middle sized, hind angles small obtuse; *Brevoorti* Lec. 19. *spoliatus* Newm.[1]

Smaller; elytra less sinuate towards the tip:

Hind angles small, prominent, rectangular, *ovulum* Chaud. 20. *acutus* Lec.

Hind angles obtuse and rounded, basal foveæ small:

Basal seta of prothorax in front of angle, elytra striate. 21. *obsoletus* Say.

Basal seta of prothorax at the angle as usual; elytra nearly smooth. 22. *lævipennis* Lec.

** Anterior transverse impression a finely impressed line near the front margin. 23. *approximatus* Lec.

b. Prosternum more deeply sulcate behind; hind angles of prothorax obtuse, not prominent:

* Anterior transverse impression a deep line, further from the front margin than in the preceding:

Elytra smooth, or very obsoletely striate. 24. *morio* Dej.

** Anterior transverse impression not impressed:

Elytra with punctured striæ, fainter behind, but not obliterated; *tenebrosa* Dej. 25. *faber* Germ.

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[1] This name seems to belong more properly to this species than to *E. faber*, to which I formerly referred as a synonym.

Feronia (Evarthrus) DILIGENDA Chaud. does not belong to this genus, but will be found in Pterostichus next to *P. mancus* Lec.

5. E. VAGANS Lec. Closely related to *E. Engelmanni*, and differs only in small size, less stout form, and more finely margined prothorax.

6. E. NONNITENS, opaque black, elytra (♀) entirely without lustre, flat, prothorax wider than long, rounded, and rather strongly margined on the sides, which are very shortly sinuate behind, hind angles rectangular, base not narrower than apex; front transverse impression deep, hind one well marked, basal foveæ deep bistriate, with a short external carina; elytra oval, scarcely wider than the prothorax, humeri broadly rounded, tip scarcely sinuate, striæ fine, punctured, marginals not approximate, interspaces broad and flat, third with the usual puncture; prosternum very deeply sulcate. Long. 18 mm.

One specimen, Red River, Louisiana. A very distinct species by the less convex form, and extremely dull color.

SYNONYMICAL REMARKS UPON NORTH AMERICAN COLEOPTERA.

BY JOHN L. LE CONTE, M.D.

In the Annals and Magazine of Natural History, November, 1870, I published some notes made during a rapid examination of various collections in London and Paris; subsequent opportunities enabled me to make some additional notes, and more careful studies of the species which I had not time to investigate on my first visits. These are contained in the present paper, with such corrections of my former notes as seem to be necessary at the present time.

1. CICINDELA LONGILABRIS Say. A specimen labelled Bermuda in the Oxford Museum.

2. C. MAGDALENÆ. Marked like CINCTIPENNIS Lec., but the prothorax is more rugose, the elytra more strongly punctured, and distinctly serrate at tip; in addition to the usual markings, dilated and connected at the margin, there is a basal white spot (as in MACRA), and a subsutural white vitta. Oxford Museum; found in turpentine barrels brought to London, supposed to be from North Carolina.

I have named this species in friendly recollection of Magdalen College, Oxford, the genial influence of which has been experienced by many scientific pilgrims to the University.

3. C. *lacerata* Chaud. from Louisiana, scarcely differs from the Mexican C. HAMATA.

4. C. PAMPHILA Chaud. An undescribed species from Texas, of stout form, allied to PALLIFERA. Elytra with the dark spaces strongly punctured, tip very finely almost obsoletely serrate; last ventral segment ♀ longitudinally impressed and marked with white spots.

5. ELAPHRUS AMERICANUS Dej. The type in the collection of Baron Chaudoir is evidently the common species afterwards described by me as *punctatissimus*. There are many other synonyms for the various races which occur in its wide distribution from the Atlantic to the Pacific, and northwards nearly to the Arctic circle.

6. NOTIOPHILUS *aquaticus*‡ Kirby. The type in the British Museum does not resemble the European species; it is more brassy

than SIBIRICUS, with the striæ of the elytra more strongly punctured; the inner rows are less impressed behind; the dorsal fovea is deep; the scutellar stria is deep, and there are four or five small punctures between it and the sutural stria. It seems therefore to be N. SEMISTRIATUS Say.

7. NEBRIA (HELOBIA) *castanipes* Kirby, afterwards described as *N. moesta* Lec., and previously as *N. Sahlbergi* Dej.

8. CALOSOMA PEREGRINATOR Guérin, Rev. Zool. 1844, p. 255; *angulatum* Lec., *prominens*‖ Lec. Resembles LUGUBRE, but is less shining and not so coarsely punctured.

9. C. ANGULATUM Chevr. Col. Mex. 1, No. 44. Resembles EXTERNUM in form, but differs in the prothorax being angulated at the sides. Mexico.

10. C. *armatum* Lap. Etudes Entom. 156; C. ALTERNANS Fabr. fide Chaudoir. Antilles.

11. *C. fulgidus* Gebler, coll. Mnizsech. A variety of VIETINGHOVII, with the elytra more coarsely reticulate. Alaska.

12. C. MÆANDER Fischer; *Lapilayi* Lap.; *Tatumi* Motsch. Extends from North America through Kamtschatka to Siberia.

13. *C. ligatus* ‡ Kirby, the type is C. SERRATUS Say.

14. CYCHRUS INTERRUPTUS Mén. (coll. Chaudoir) is *C. constrictus* Lec.

15. C. ALTERNATUS Motsch. (ibid.) is as large as *C. striatopunctatus* Chaud., but the elytra are broader, and the prothorax a trifle narrower, with the hind angles more distinctly margined behind; the specimens are ♀, and they seem to belong to the large one having only two joints of the ♂ front tarsi spongy beneath.

16. *Cymindis marginata* Kirby; *reflexa* Lec.; CRIBRICOLLIS Dej.!

17. C. UNICOLOR Kirby is a small immature specimen of *C. hudsonica* Lec.; the sides of the prothorax are more widely margined than in PILOSA, distinctly sinuate behind, and the hind angles are prominent.

18. C. VENATOR Dej., according to Baron Chaudoir differs from AMERICANA Dej. My series is not sufficiently large to decide this point.

19. A specimen of TRICHOTHORAX CYANEUS Montr., from New Caledonia, in the collection of Mr. Perroud at Lyons, is very similar to the variety of our RHOMBODERA PALLIPES in which the prothorax and legs are yellow.

20. *Anchomenus angusticollis*‡ Kirby agrees with the common race of PLATYNUS SINUATUS, except that the basal angles of the prothorax are less prominent, the basal impressions and the elytral striæ less punctured. The specimen of P. STYGICUS Lec. shown me on a former visit to the British Museum was erroneously labelled, but was not Kirby's type; the synonym given in Annals and Magazine of Nat. History, Nov. 1870, p. No. 5, is therefore incorrect.

21. A. EXTENSICOLLIS. Mr. Kirby's specimens belong to the elongate bluish-green race, without any elevation in the basal impressions of the prothorax.

22. AGONUM AFFINE Kirby is *Harrisii* Lec.

23. A. PICIPENNE Kirby. Var. (*a*) is a species as large as P. RUFICORNIS Lec., with the prothorax equally elongate, and the sides not explanate or reflexed; it seems to be *lutulentus* Lec.

24. A. *picipenne*, vars. (*c* and *d*) are RUFICORNIS LEC.

25. A. SORDENS Kirby, (*a*) could not be found; (*b*) seems to be *fuscescens* Chaud.

26. A. SEMINITIDUM Kirby. I learn from Mr. C. O. Waterhouse that this species differs from P. CHALCEUS Lec. by the elytra being shorter, more shining, and less parallel at the sides.

27. *Stereocerus similis* Kirby, is the species of Amara described as FERONIA HÆMATOPUS Dej.

28. CYRTONOTUS RUFIMANUS Kirby has the sides of the prothorax distinctly sinuate behind, and the hind angles prominent. It seems (without comparison) to be *A. lacustris* Lec. *C. brevilabris* Kirby is a specimen of the same species with the labrum retracted under the epistoma.

29. *C. convexiusculus* ‡ Kirby is A. LATICOLLIS Lec. The European species is narrower, with the prothorax much more narrowed behind and more sinuate on the sides, as in A. JACOBINÆ Lec.

30. C. LATIOR Kirby is *A. libera* Lec., = *lævistriata* Putzeys, a Bradytus with sides of prothorax rounded, hind angles obtuse and not rounded.

31. AMARA IMPUNCTICOLLIS Say. Mr. Kirby's specimens have the sides of the prothorax more oblique and less rounded, and the basal foveæ more distinct than in the specimens sent by Mr. Sprague for comparison, but I do not think that it is a different species.

32. *A. vulgaris* ‡ Kirby, is a rather elongate flattened species

with the basal foveæ of the prothorax double, distinct, and well separated, very feebly punctured; elytra strongly sinuate towards the tip; hind tibia ♂ slightly curved, not pubescent on the inner face. It is of the size of INTERSTITIALIS, and very nearly related to it, but more depressed, and with deeper prothoracic basal foveæ, and seems to be what I incorrectly determined as LÆVIPENNIS Proc. Acad. Nat. Sci. 1855, 353.

33. *A. discors* Kirby = CHALCEA Dej., has the hind angles of the prothorax sharply defined, the base of the prothorax is not punctured, and the sides not explanate; it seems therefore to be A. CHALCEA Dej.

34. A. LÆVIPENNIS Kirby is a small species of bright bronze color, with the sides of the prothorax not explanate, basal foveæ distinct, striæ of elytra fine, not deeper behind; antennæ apparently entirely black, hind tibiæ ♀ not pubescent on inner side. Size of European A. COMMUNIS, but quite distinct. I have described this species as *erratica* Proc. Acad. Nat. Sci. 1855, 353.

35. A. PALLIPES Kirby. Correctly determined in my cabinet. Narrower and more convex than ANGUSTATA Say, with the basal foveæ very distinct.

36. *Isopleurus nitidus* ‖ Kirby is AMARA SUBÆNEA Lec. The mentum tooth is not emarginate and but slightly impressed at tip.

37. I. MACLEAYI Kirby is a Selenophorus allied to S. STIGMOSUS but with the basal angles of prothorax rectangular. Probably from the Antilles, certainly not East Indian.

38. MISCODERA AMERICANA Mann. (coll. Chaudoir) is very similar to M. HARDYI Chaud., but is smaller, more bronzed, with more globose and narrower prothorax, and elytral striæ still more obliterated.

39. DICÆLUS SCULPTILIS Say. The more convex and shining northern race of this species has been named INTRICATUS by Baron Chaudoir.

40. D. AMBIGUUS Ferté, not different from *opacus* Ferté, and *reflexus* Lec.

41. *Badister peltatus* ‡ Dej. The insect mentioned as the American variety of this species is B. FLAVIPES Lec.

42. LICINUS SILPHOIDES. Two specimens of this insect from North American turpentine are in the Oxford Museum. I have seen several which were taken alive in Massachusetts; so that it must be regarded as fairly introduced into our fauna.

43. CHLÆNIUS FULGICEPS Newman, could not be found in the British Museum.

44. *C. emarginatus* ‡ Kirby, could not be found.

45. *C. impunctifrons* ‖ Kirby, by comparison is C. PENSYLVANICUS Say.

46. *C. chlorophanus* Dej. is C. SOLITARIUS Say.

47. C. CORDICOLLIS Kirby is *C. chlorophanus*‡ Lec. = *C. Lecontei*↓ Dej.

48. *C. quadricollis* Kirby is a green variety of TRICOLOR, and not BREVILABRIS Lec., which is not among Kirby's specimens.

49. POLPOCHILE Sol. = *Melanotus* ‖ Dej. = *Cratocara* Lec. = *Phymatocephalus* Schaum.

50. *Harpalus laticollis* Kirby on comparison proves to be ANISODACTYLUS NIGERRIMUS Dej., and not A. HARRISII Lec. as incorrectly stated by me in Ann. and Mag. Nat. Hist.

51. H. INTERPUNCTATUS Kirby is the species which I have determined (New Species p. 15) as A. NIGRITA Dej., but which Baron Chaudoir considers different, and has named *A. Lecontei.*

52. H. OCHROPUS Kirby agrees with *desertus* Lec., except that the hind angles of the prothorax are nearly impunctate.

53. H. BASILLARIS Kirby is *obesulus* Lec. and = *Amara externa* Walker.

54. DICHIRUS BRUNNEUS Dej. (coll. Chaudoir) is like PICEUS in form, but smaller, with the hind angles of the prothorax rectangular and slightly prominent.

55. *Trechus similis* Kirby is the common *Agonoderus*, with the hind angles of the prothorax rounded; COMMA Fabr. (*fide* Zimm. *pallipes*‡ Say, Dej.)

56. *T. flavipes* Kirby is BRADYCELLUS RUPESTRIS (Say).

57. *T. ruficrus* Kirby is B. COGNATUS, as correctly observed by Baron Chaudoir.

58. *T. immunis* Kirby is STENOLOPHUS CONJUNCTUS (Say).

59. PERYPHUS CONCOLOR Kirby. On renewed examination this appears to be *Bembidium salebratum* Lec.

60. PERYPHUS PICIPES Kirby. The specimen is in bad condition, but seems to be of very convex form. It is smaller than 79–78 Sprague, and has the elytral striæ very finely punctured.

61. P. SCOPULINUS Kirby is *B. gelidum* Lec.

62. *Notaphus variegatus*‖ Kirby is not VERSICOLOR Lec., but a

smaller species with more convex prothorax more narrowed at the base; it seems to be B. PICTUM Lec.

63. N. INTERMEDIUS Kirby of the same size as VERSICOLOR, but with the sides of the prothorax distinctly sinuate near the base; seems to be *B. rapidum* Lec.

64. N. NIGRIPES Kirby, very similar to INTERMEDIUS, but nearly black, with small pale spots and dark legs.

65. *Tachyta picipes* Kirby is *T. inornatus* (Say) = T. NANUS of Europe, as correctly determined by Schaum, Ins. Deutschl. i.

66. HALIPLUS PANTHERINUS Aubé. The type in the British Museum is a small species resembling IMMACULICOLLIS in size and color.

67. COLPIUS INFLATUS Lec. = *Suphis Doubledayi* B. M. Cat.

68. SUPHIS FORSTERI† B. M. Cat., size of GIBBULUS, but the elytra are very strongly punctured.

69. HYDROCANTHUS HARRISII† B. M. Cat., size of GIBBULUS, but narrower, with the elytra black, finely and obsoletely punctured.

70. COLYMBETES PHÆOPTERUS Kirby. ♂ with the last joint of front tarsi not deformed; ♀ sides of prothorax finely margined, very slightly rounded, scarcely forming an angle with the elytra, very finely reticulate, somewhat dull; elytra very finely granulato-reticulate, and sparsely punctulate.

71. C. BICOLOR Kirby. More regularly elliptical and convex than the preceding, also finely granulato-reticulate, but scarcely punctulate, prothorax similar in form, but not more reticulate in ♀ than ♂; elytra pale towards the sides. Both species are allied to AGABUS DISCOLOR.

72. C. RETICULATUS Kirby is allied to AGABUS ARCTICUS of Europe.

73. COLYMBETES SINUATUS Lec. should be compared with the European C. GRAPII, which it closely resembles.

74. *Acilius Maccullochii* Kirby is MEDIATUS Say.

75. HYDROPORUS EXIGUUS Aubé. Nothing like this is in our collections.

76. NECROPHORUS MELSHEIMERI Kirby, evidently the form named *infodiens* Mann. The prothorax is as in *maritimus* of which it is a variety; antennæ with the base of the club black, remaining joints red; elytra with two bands and epipleuræ red.

77. *N. Hallii* Kirby is ORBICOLLIS Say.

78. *N. hebes* Kirby is a variety of VESPILLOIDES; the prothorax is as in MARITIMUS, club of antennæ entirely black, elytra with two bands, the front one extending forwards on the epipleuræ to the humeri, leaving a black portion behind the humerus on the upper side of the epipleura.

79. LEIODES PUNCTOSTRIATUS Kirby has the hind tarsi 4-jointed, and is therefore an Anisotoma, and not Hydnobius, as incorrectly stated by Erichson. The punctures of the rows are very large, and those of the alternate spaces also large.

80. PSELAPHODES Westwood is allied to Tmesiphorus, but differs in form of palpi.

81. *Sintectus* Westwood equals TMESIPHORUS Lec. The Australian species closely resembles T. COSTALIS Lec.

82. ALEOCHARA PALLITARSIS Kirby is a rather large black Homalota, with the prothorax broadly impressed near the base, and feebly channelled; elytra brownish, a little wider than prothorax, finely not densely punctulate and pubescent; abdomen dorsal surface shining, not strongly punctured; antennæ heavy, black, 2d and 3d joints each more than ½ longer than 4th; scape stouter and a little longer than the 2d. A common species.

83. *Tachyporus acuductus* Kirby is VENTRICULUS Say; the right elytron is striated and rugose towards the tip, but the left is uniformly finely punctulate.

84. T. AFFINIS Kirby is nearly of the same form, but less convex; the prothorax very finely, and the elytra very strongly punctulate.

85. OMALIUM PLANIPENNE Mäklin is *O. pineti* Thomson.

86. DISTEMMUS ARGUS is very similar to and perhaps identical with a European species of Omalium.

87. OMALIUM MARGINATUM Kirby is an Olophrum with the prothorax sparsely and coarsely punctured, slightly narrowed behind, hind angles obtuse but distinct, disk moderately convex; elytra very strongly punctured, nearly as long as the abdomen. Described by Macklin under the same name.

88. *O. sanguineum* and *perocellatum* ‡ B. M., from Hudson Bay, are allied to O. CONVEXICOLLE Lec.

89. *Acidota seriata* Lec. is CRENATA (Fabr.) according to Mäklin, Stettin Ent. Zeitung, 1872, 247.

89*a*. NITIDULA OBSCURA and *ossium* Kirby is the black immacu-

late species which is not uncommon in the northern parts of the continent.

90. N. DISCOIDEA Fabr., Kirby seems to be the Californian *Omosita inversa* Lec., but the northern specimens are smaller.

91. EPURÆA BOREELLA Er., a small narrow black species similar to NIGRA Mäklin, common to Europe and North America.

92. EUROPS Wollaston is *Nomophlœus* Lec.

93. HESPEROBÆNUS TESTACEUS‡ Motsch. is a species of Bactridium, broader than B. NANUM and uniformly testaceous.

94. *Atomaria atra*‡ Kirby is a small convex shining coarsely punctured species; elytra testaceous, legs and abdomen pale yellow. Probably a dark variety of A. LÆTULA Lec., and not at all like the European A. ATRA.

95. ANCHOMMA Lec. Compare with MICROTELUS Sol. Ann. Ent. Tr., 1838, pl. 1, f. 3.

96. CORTICARIA DENTICULATA Kirby is quite different from C. SERRATA of the same collection; it is smaller, nearly black, prothorax broadly and deeply foveate near the base, sides much rounded, regularly and less coarsely serrate.

97. LOBERUS Lec.; a species of this genus from Chili is in the British Museum.

98. CATOGENUS PUNCICOLLIS Newm. is not in the British Museum.

99. PENTHELISPA Pascoe (Oct. 1860) is *Endectus* Lec. (May, 1861).

100. MINTHEA Pascoe seems allied to TROGOXYLON Lec.

101. HEMIPEPLUS MARGINIPENNIS Lec. seems to be *Ochrosanis Dohrnii* Pascoe, 1866.

102. *Elacatis*‖ Pascoe (1860), is OTHNIUS Lec. (1861.) The geographical distribution of this genus is very remarkable; Borneo and United States.

103. THORICTUS; I saw in Mr. Sallé's collection the only representative of this family thus far found in America; a small species collected in San Domingo.

104. BYRRHUS PICIPES Kirby, a rather large species with a transverse submarginal black spot on the elytra behind the middle. It is correctly determined in my synopsis.

105. DICHELONYCHA VIRESCENS Kirby is the common northern species with the prothorax tolerably densely punctured, thinly pubescent, feebly channelled; the lateral angles are distinct, the

basal ones well defined acute, but not prominent. It is *subvittata* of my synopsis, Journ. Acad. Nat. Sc., 2d. ser. iii. 279.

106. MELOLONTHA PARADOXA Beauvois, according to Sallé, is *Rhipidandrus flabellicornis* (Sturm).

107. The Australian genera PHYLLOTOCUS and MACROTHOPS McLeay are related to ONCERUS Lec. in form and by the double epistoma.

108. CHEIRAGRA McLeay from Australia is allied to CHNAUNANTHUS Burm. and ACRATUS Horn. The position of the spiracles must be observed in these genera to determine their true affinities.

109. Liogenys, Homalochilus, and Hilarianus have the propygidium connate with the fifth ventral as in DIPLOTAXIS, which they resemble in form and sculpture.

110. HYPOTRICHIA Lec. and PLECTRODES Horn agree in form and general characters with CLAVIPALPUS, but the last differs in having the ungues alike, and armed with a broad acute tooth. The propygidium is connate with the fifth ventral and the spiracle is placed on the connecting suture; the fifth ventral is elongated.

111. LEURETRA Er. resembles CLAVIPALPUS by the fifth ventral being elongated, but the mouth organs are less developed, as in other Pachypodidæ, with which the three genera mentioned in 110 must probably be associated.

112. DIPLOTAXIS GEORGIÆ Blanchard (Paris Museum) is similar to D. SUBCOSTATA Blanch. but larger, with the prothorax more sparsely and coarsely punctured, and the interspaces of the elytra flatter and not subcostate behind. D. MOESTA of the same collection seems only an individual variation of SUBCOSTATA, larger than usual, with the punctures of the occiput and prothorax more feeble.

113. *D. Harperi* Blanch. is allied to EXCAVATA, but is ferruginous, with the epistoma rounded, not at all truncate, and frontal carina impressed at the middle.

114. *D. frondicola* ‡ Blanch. is also allied to EXCAVATA, black, with the elytra a little more rugosely punctured; seems only an individual variety.

115. *D. punctato-rugosa* Blanch. is EXCAVATA Lec. The form is not "breviter ovata" as described, and the upper tooth of the front tibiæ is feeble. The description being erroneous, the name should be dropped into synonymy.

116. ANCYLONYCHA PROFUNDA Blanchard seems to be *Lachnosterna rugosa* Lec.

117. *A. brevicollis* Blanch. is a race of L. FUSCA, = *consimilis* Lec.

118. *A. fervida* ‡ Blanch. (nec Fabr.) is L. OBESA Lec.

119. *A. puncticollis* Blanch. is a race of FUSCA.

120. *A. fervens* ‡ Blanch. (nec Gyll.) is CONGRUA Lec.

121. *A. uniformis* Blanch. is L. EPHELIDA (Say).

122. *A. pruinosa* ‡ Blanch. (nec Mels.) = L. FUTILIS Lec.

123. A. FRATERNA (Harris), correct.

124. A. KNOCHII Gyll.; correct for one ♀, sexual characters as in PROFUNDA (*rugosa* Lec.). Under the same label are two specimens of another species allied to PRUNINA.

125. *A. crenulata* ‡ Blanch. is L. HIRTICULA (Knoch).

126. A. CRASSISSIMA Blanch. is a short stout species from Texas; the ♂ sexual characters as in FUSCA; ♀ with last ventral segment semicircularly incised at tip; *obesa* Lec.

127. A. GLABERRIMA Blanch. My determination (Synopsis Journ. Acad. Nat. Sc. l. c. 242) is correct.

128. *A. micans* ‡ Blanch. (nec Knoch); two ♀ which seem to be L. CERASINA Lec. or an allied species.

129. A. DIFFINIS Blanch. A very distinct species; ♂ with the fixed spur of hind tibiæ elongated, and last ventral segment not impressed; antennal club very long.

130. A. HIRSUTA Knoch, correct.

131. *A. pilosicolis* Knoch, is the race of L. TRISTIS (Fabr.), with the pubescence of the elytra longer than usual.

132. CREMASTOCHILUS HARRISII Kirby (Mus. Oxon.) has the prothorax shining, the front angles are rounded and auriculate, the sides are deeply impressed behind the front angles; the hind angles are not much retracted, surrounded by a deep sulcus; there is a patch of hair on the disk each side in front of the hind angles; the mentum is deeply notched behind.

133. My notes on Buprestidæ from the types of Gory and Laporte, now in the collection of Count Mniszech in Paris, have been partly utilized by Mr. Crotch in his "Notes on the species of Buprestidæ found in the United States" (Proc. Acad. Nat. Sc. Phil. 1873, p. 84). But it remains for me here to express the great obligations I am under to Count Mniszech, and to the other possessors of types which I had occasion to study, for the facilities

for comparison and the great personal kindness extended to me during my short visits to the larger cities of Europe.

134. DICERCA OBSCURA (*Fabr.*) Lec. is *B. lurida* and *consimilis* Gory and Laporte.

135. *D. hilaris* Lec. ♀; *manca* Lec. ♂, is TUBERCULATA G. and L.

136. D. DISTINGUENDA G. and L. is colored like *hilaris*, but stouter, with the hind angles of prothorax less prolonged; probably a bright ♂ specimen of D. TENEBROSA Kirby.

137. D. PRUINOSA G. and L. resembles LURIDA, but the prothorax is slightly wider behind; middle tibiæ ♂ obtusely angulated on inner side; *soror* Lec.

138. *D. obscura* ‡ Gory is BALTIMORENSIS (Herbst.) Lec.

139. D. SCOBINA Chevr. is *molitor* Mels. and *asperata* L. and G.

140. D. SPRETA G. and L. is *impressifrons* Mels.

141. D. TUBERCULATA Chevr. is Dumoulinii Gory; the prothorax is widely dilated on the sides as in CRASSICOLLIS* Lec., and the disk is deeply excavated obliquely each side; the markings are irregular as in SCOBINA.

142. *D. coryphæa* ‡ Dej. is a very large southern form of SPRETA.

143. *D. maculosa* ‡ Gory is LEPIDA Lec.

144. *D. erecta* L. and G. is PŒCILONOTA CYANIPES (Say).

145. *Ancylochira dilatata* Motsch. is LÆVIVENTRIS Lec.

146. *A. crenata* Motsch. is LANGII Mann.

147. A. VILLOSA n. sp. Elytra like AURULENTA, prothorax flattened, side margin thickened, disk with a broad dorsal stripe, and oblique space each side smooth; prothorax and under surface thinly clothed with long soft white hair. California, coll. Mniszech.

148. A. APRICANS Herbst. A specimen was collected by Lorquin in California.

149. *Melanophila luteosignata* Dej. is a small variety of NOTATA with more convex prothorax.

150. ANTHAXIA BIVITTATA L. and G. Not in our collections; nearly as elongate as FLAVIMANA.

151. A. ÆNEOGASTER L. and G. is *expansa* ♀ and *foveicollis* ♂ Lec.

152. CHRYSOBOTHRIS ERRANS L. and G. is very near CUPROÆNEA L. and G. from Cayenne, and is probably from South America.

153. *C. Alabamæ* Gory is similar to the ordinary race of FEMORATA, but the prothorax is more narrowed behind and more deeply channelled; *C. nigritula* Gory is similar but more deeply punctured.

C. difficilis Gory is also similar, but with the hinder impression of the elytra more sinuated, and is = *rugosiceps* Mels.

154. *C. ignipes* Gory is SEXSIGNATA (Say).

155. *C. Germari* Gory seems to be a variety of the Mexican C. SOLIERI, and has not occurred thus far in the United States.

156. C. FEMORATA (Fabr.) coll. Dej. is *viridiceps* Mels.

157. *C. viridipunctata* Gory is a variety of HYBERNATA in which the metallic green spot at the base of the elytra extends beyond the impression.

158. *C. floricola* Gory is CALCARATA Mels. and *femorata* ‡ L. and G.

159. *C. rugosula* Gory is ACTENODES ACORNIS (Say).

160. *Actenodes bella* Lec. does not differ from AUREONOTATA Gory, found in Cuba and South America; the locality of the specimen collected in Georgia is absolutely correct.

161. *C. basalis* Lec. is ATABALIPA Gory and *Colobagaster multistigmosa* Mann.

162. C. LESUEURI Gory is *soror* Lec.

163. *G. fastidiosa* Gory is *Lesueuri* ‡ Lec.

164. *C. quadriipressa* Gory *misella* Lec. is a small variety of this species.

165. *C. nigrofasciata* ‡ Lec., Tr. Am. Phil. Soc., xi., 240, is quite different from the Mexican species, and from MELAZONA Gory; it may therefore be named ATRIFASCIATA.

166. *Polycesta obtusa* Lec. seems to be VELASCO L. and G.; there is an error in the reference to the plate in my paper, it should be fig. 6, not 7.

167. ACMÆODERA MIMA Gory is *semivittata* Lec.

168. A. PULCHELLA (Herbst.) Gory and *dispar* Gory are *A. variegata* and *mixta* Lec.

169. A. STELLARIS Chevr. is *rubronotata* Gory, *hæmorrhoa* Lec., and *fasciatopunctata* Chevr.

170. A. FLAVOSTICTA ‡ Sturm is *croceonotata* ‡ Lec.

171. A. CUPRINA Spin.; two specimens were collected in California, by Lorquin, one of which was kindly given to me by Count Mniszech.

172. MASTOGENIUS Solier is the same as *Haplostethus* Lec.

173. CORÆBUS CALIGINOSUS Gory is a South American species.

174. AGRILUS NIGRICANS Gory, size of RUFICOLLIS, finely punctured, hind angles of thorax scarcely carinate.

175. A. PULCHELLUS Bland; I saw a specimen of this species from Texas, in the collection of Mr. Perroud, at Lyons; and in the same collection I saw two new species: 1, larger than ACUTIPENNIS, bronzed, coarsely punctured, hind angles of prothorax acutely carinated; 2, larger and stouter than MUTICUS Lec., more shining, bright green.

176. *A. Couesii* Lec. is *aureus* Chevr. and *perlucidus* Gory.

177. A. ZEMES Gory ♂ is *quadriguttatus* Gory ♀.

178. BRACHYS CORVINA Gory is *lugubris* Lec.

179. B. TESSELATA Fabr. is LÆVICAUDA Lec., according to Gory.

180. B. PRÆTEXTA Gory is the small black species resembling TESSELATA.

181. PHLEGON HERCULEANUS Lacordaire is South American, and must therefore be stricken from the List.

182. ADELOCERA SPARSA Cand., quite distinct; not uncommon in California.

183. A. PROFUSA Cand., is *cavicollis* Lec.

184. MERISTHUS SCOBINULA Cand. The Chinese specimens have the scutellum very strongly and acutely carinate; in the Mexican it is finely carinate, and in both the sides of the prothorax and the basal edge are *not serrate.*

185. *Alaus gorgops* Lec. is EL. LUSCIOSUS Hope, Griff. An. Kingd., 363, pl. 31.

186. PERIMECUS SIMILIS Kirby, size of M. COMMUNIS, but a little narrower; prothorax more coarsely and sparsely punctured, scarcely impressed behind; third joint of antennæ narrower and shorter than fourth, about twice as long, but scarcely wider than second; hind angles of prothorax bicarinate.

187. MELANACTES PICEUS. In the Oxford Museum I saw two specimens from the Lee collection labelled *E. aterrimus* Fabr. and one *E. lacunosus* Fabr.

188. ODONTONYX. There is a beautiful species of this genus from China in the Oxford Museum, in which the ♂ has the antennæ ramose.

189. TELEPHORUS MANDIBULARIS Kirby, is the smaller black species, with the prothorax more convex and feebly channelled, and the lustre obscured by very fine hairs. T. FRAXINI Say is larger and has the prothorax more polished, and more deeply impressed.

190. DASYTES FOVEICOLLIS Kirby belongs to PSILOTHRIX.

191. *Tillus picipennis* White, B. M. Cat., from India, is the cosmopolitan TARSOSTENUS UNIVITTATUS.

192. HYDNOCERA RUFIPES Newm. is a beautiful blue species, of the same form as HUMERALIS, with the elytra very coarsely but not densely punctured, mouth, antennæ, and legs bright reddish-yellow.

193. H. ÆGRA Newm. Quite distinct from any species in our collections. The prothorax is narrowed behind, constricted at each end; elytra shining, strongly punctured.

194. DRIAMERUS Solier from Chili resembles strongly and is perhaps congeneric with MELYRIS CRIBRATUS Lec.

195. The Australian genus OMMA Newm. is evidently allied to CUPES, especially to C. SERRATA Lec., and is one of those curious examples of geographical distribution, of which we have already instances in DERATAPHRUS, NYCTOPORIS, and TMESIPHORUS. A species of CUPES occurs in Japan, which, on the other hand, resembles C. CONCOLOR from the Atlantic States.

196. STAGETUS Wollaston should be compared with PROTHECA Lec. The resemblances between the Coleopterous fauna of North America and the Atlantic Islands are neither few nor unimportant.

197. LEBASIELLA PALLIPES Klug is *nigripennis* Lec., a Mexican species to be stricken from the list.

198. NYCTIPETUS. One of the most extraordinary instances that I have noticed, of resemblance which, if connected by geographical coincidence, would be termed mimicry, is between a Chilian species of this genus, living in arid plains, and AMPHIZOA LECONTEI Matthews, a subaquatic adephage found in Vancouver and Utah.

199. EMEAX SCULPTURATUS Pascoe, from Australia, is a species of NYCTOPORIS, barely different from N. GALEATA Lec., which is found at San Diego, California, by the humeri being *not dentiform*, though the hind angles of the prothorax are rectangular and prominent.

200. ELEODES TUBERCULATA Mann. is *viator* Lec.

201. *Eleodes subtuberculata* Walker is GRANULATA Lec.

202. *E. latiuscula* Walker is HUMERALIS Lec.

203. *E. binotata* Walker is SPONSA Lec.

204. *E. conjuncta* and *convexicollis* Walker are OBSCURA (Say).

205. Exerestus Bates is RHINANDRUS Lec. (1862): *E. Jansoni* Bates is R. ELONGATUS Horn, from Nicaragua.

206. *Polypleurus geminatus* ǂDej. according to the types in Mr. F. Bates's collection, is the smaller species with narrower prothorax.

207. According to Mr. F. Bates the genera Calcar, Zolodinus, and Centorus are exceptions to the ordinary structure of the ventral segments in the allied genera, the hind margin of the segments not being membranous, but entirely corneous, as in Asidĭdæ.

208. TENEBRIO CASTANEUS, as pointed out to me by Mr. Bates, agrees with the genera just named in the ventral segments being entirely corneous, but is peculiar in having the eyes completely divided by the eyes as in Blapstinus. It evidently indicates a new genus, to be associated with the others as a distinct tribe, CALCARINI.

209. PACHYURGUS ÆREUS (Mels.) seems to be *Encyalesthes brevicornis* Motsch., found in Java, Gilola, Malaysia; it is therefore to be stricken from the list.

210. EPHALUS Lec. does not in the least resemble LEICHENUM, with which it is united by Gemminger and Harold.

211. RHIPIDANDRUS Lec. I have seen a species from Guadaloupe in the collection of Mr. Sallé, to whom I am indebted for the remark that MELOLONTHA PARADOXA Beauv. is the same as *R. flabellicornis*. Vide No. 106.

212. ICTISTYGMA Pascoe, from Australia, seems hardly different from EURYGENIUS.

213. ISCHALIA Pascoe (1860) is *Eupleurida* Lec. (1862). The North American species differs from the Bornean one chiefly in color, the latter being of a uniform indigo color, while the former is black and yellow.

214. *Macratria linearis* Newm. The base of the prothorax is not narrower than the widest part in front of the middle, and the species does not seem to differ from the common M. MURINA.

215. EUSTROPHUS BICOLOR. The proper authority for this species is Say, the first describer; *Mycetophagus bicolor* Fabr. is probably a Platydema.

215*a*. SCRAPTIA. Several allied foreign genera have the eyes hairy like Xylophilus, Stereopalpus, etc.

216. ANASPIS COLLARIS Lec. should be compared with the European A. RUFICOLLIS.

217. TOPOSCOPUS Lec. I saw in the collection of Mr. Fry an Australian species of this genus, and also a new genus having

like it divided eyes, but of broader form, with the ramus of third antennal joint as long as the others.

218. MELOE IMPRESSA Kirby; the prothorax is a little longer than broad, dull, sparsely punctured, elytra deeply rugose; color dark blue; ♂ with the antennæ irregular.

219. M. NIGRA Kirby. Quite different, prothorax shorter, more convex, more punctured, head also more punctured, elytra less deeply rugose, abdomen extremely finely rugose; color nearly black.

220. *Apate* (*Lepisomus*) *rufipennis* and *nigriceps* Kirby are specimens of Polygraphus.

221. *A.* (*L.*) *brevicornis* Kirby is in such bad condition as to be not recognizable.

222. CERAMBYCIDÆ. My notes on this family have been employed in the parts of the classification, New Species, and List of North America Coleoptera relating to this family, with the exception of the few here detailed.

223. CLYTUS DECORUS Oliv. Oxford Museum; a species of Cyllene not in our collections.

224. CLYTUS CARINATUS Gory. Oxford Museum. Not in our collections; perhaps South American.

225. CLYTUS COMPRESSICOLLIS Gory, like VERRUCOSUS, but with prothorax much more compressed and elevated; perhaps an individual variation.

226. CLYTUS ANTENNATUS White, Brit. Mus. Cat., 252, is *Arhopalus eurystethus* Lec.

227. PHYTON PALLIDUM (Say). A specimen in the British Museum is labelled MACULATUM Oliv. (Saperda), but it agrees so little with the description that we are not warranted in adopting the synonymy.

228. *Stenaspis unicolor* Dupont is CER. SOLITARIUS Say.

229. ELAPHIDION ARCTUM Newm. is the common small narrow species with the antennal spines short, and the elytral spines long, and was considered by Dejean as E. VILLOSUM Fabr.

230. E. VILLOSUM (Fabr.) Newm. is *putator* Peck, *pruinosum* (†Dej.) Guérin.

231. *Agennopsis* Thomson is *Talæopora* †Dej., ADETUS Lec. The type given me by Dr. Melsheimer (POLYOPSIA ANALIS Hald.) is Brazilian, and not North American.

232. PSENOCERUS SUPERNOTATUS (Say.), *Acharis lunifera* †Dej.

ON TWO NEW SPECIES OF SAURODONTIDÆ.

BY E. D. COPE, A.M.

PORTHEUS LESTRIO, Cope.

Represented by a portion of the cranium, including both mandibular rami, and the maxillary and premaxillary bones of one side, all with dentition nearly complete. The size of these parts considerably exceeds that of corresponding ones in the two other species of the genus, and indicates a large and powerful fish. It differs from the *P. molossus* and *P. thaumas*,[1] in having three premaxillary teeth instead of two, and in the relative positions, numbers, and sizes of the other teeth; also in the prominent edentulous superior distal extremity of the dentary bone.

The first premaxillary is very large, the two others of moderate size. These are followed by a long rugose diastema before the maxillary teeth begin; these are, one small, five large, twenty-two small, and eleven or twelve very small. The mandibular teeth are, one very large, one immense, one small, one medium, four small, eight large, and two small; total eighteen. The teeth are all simply round or oval in section, and the external, probably cementum layer, is smooth. The maxillary bone has two large superior proximal condyles, separated by a space; the anterior is the narrower, and is directly behind the premaxillary condyle. The anterior margin of the latter bone is very rugose.

	M.
Length of tooth line of upper jaw	.300
" " premaxillary	.058
Depth, premaxillary (axial)	.095
" maxillary at second condyle	.095
" " twentieth tooth	.065
Diameter base first premaxillary tooth	.018
" bases five large maxillaries	.052
Length of dentary above	.270
Depth at second large tooth	.095
" at last tooth	.105
Diameter base first large tooth	.013
" " second "	.020
Length crown of second large tooth	.050
" " sixth from behind	.025

[1] See Proceedings Am. Philosophical Society (On Fishes of the Kansas Cretaceous) January, 1872.

If of the same proportions as the *P. molossus*, the vertical diameter of the head of this fish would be twenty-three inches.

A complete cranium of a *Portheus*, probably the *P. molossus*, for which I am indebted to my friend Professor Merrill, of Lincoln University, at Topeka, Kansas, furnishes several points of interest previously unknown. The mouth is nearly vertical, somewhat as in *Osmeroides*, while the vertex is surmounted by an elevated crest. Hence the superior and inferior facial outlines meet at a right angle at the muzzle. The orbit is small, and there is a suborbital chain of laminiform bones. The elevation of the skull is 16.75 inches, while the length is only 12.75 inches.

The specimen of *P. lestris* was procured by Professor B. F. Mudge, of Manhattan, Kansas, during his survey of 1872, near the Solomon River. Prof. Merrill's specimen was obtained from the same region.

PORTHEUS GLADIUS, Cope.

Established on a spine of the kind which I have supposed to be pectoral, and which resembles one I have described (loc. cit., p. 332) as from *P. molossus* or *P. thaumas*. It is, however, relatively much thicker than that one, and absolutely much larger, and might pertain to the *P. lestris*, but there is no evidence to that effect.

When complete, the spine measured, according to Professor Mudge, forty-one inches in length; the portion now before me measures thirty-one inches. The margin is exceedingly acute and is coated with an enamel-like layer, which conceals the rods of which the spine is composed. Near the middle of its length these rods number thirty, but whether the entire width is preserved is uncertain. The transverse section is a crescent from the base to beyond the middle, the surface being thus somewhat trough-like. The spine has been somewhat distorted by pressure, but I cannot discover that the form in question is entirely due to that cause. The edge is excavated and notched at irregular points, indicating the frequent use to which this formidable weapon was put during the life of its possessor.

	M.
Total length (*vide* Mudge)	1.040
Width near middle	.175
Thickness posteriorly in middle	.012

Discovered by Prof. Mudge near the upper waters of the Solomon River, Kansas.

DAPTINUS, Cope, gen. nov.

This genus is proposed for the *Sarrocephalus phlebotomus*, Cope.

The form of the crowns of the teeth is that of *Sarrocephalus* and *Erisichthe*, but it differs from the latter in their perfect equality of size. It differs from the former in the position of the nutritious foramina of the inner side of the dentary bone, for instead of forming an independent series as in that genus, they only appear as notches on the inner margins of the alveoli. But one species is known as above, which is from the Niobrara cretaceous of Kansas.

ON SOME NEW BATRACHIA AND FISHES FROM THE COAL MEASURES OF LINTON, OHIO.

BY E. D. COPE, A.M.

The following descriptions of some interesting forms are published by permission of Prof. John S. Newberry, who procured the specimens in the course of the geological survey of Ohio, of which he is director.

LEPTOPHRACTUS, Cope, gen. nov.

Established on various portions of the cranium of a large Batrachian allied to the *Labyrinthodontia*. The top of the head is covered with angular plates or scuta arranged in the following manner on the region preserved. Two symmetrical scuta occupy the median line, one in front of the other. One of these is a longish or coffin-shaped hexagonal, with the suture with the other concave. The latter is more ovoid, broad and convex next the first mentioned, and somewhat more contracted at the opposite extremity. Beyond this are two shields joining by a straight suture on the middle line; besides this one, they have two concave sutures for scuta, at the farther end two concave lateral sutures, and a straight one to the adjoining median scutum, whose suture is also concave. On each side of this median plate is a large area surrounded before, outwards, and behind by smaller scuta, three in front, two at the side, and two behind. Commencing with the first, No. 1 has been already described; No. 2 is small, oval, and antero-posterior; No. 3 is an antero-posterior pentagon with the narrowest side inwards; No. 4 is a similar transverse pentagon; No. 5 is an antero-posterior pentagon which presents its shorter lateral facet inwards; No. 6 has a similar character, but is smaller and with more definite angles. Another series of scuta is seen outside of these at one end of the series. Three of this set bound the front and side of each of the median pair above mentioned, leaving a short facet next its fellow unaccounted for.

The sculpture consists of radiating ridges and tubercles which are most broken near the centres of the scuta.

The teeth are rather distantly grooved for some distance above the base. They are of different sizes; the smaller are compressed and with fore and aft cutting edges.

This type is weaker and more slender than Labyrinthodon, and the cranial scuta appear to be very thin. It is possible that this part of the specimen may only be a cast, but I am not satisfied of this.

LEPTOPHRACTUS OBSOLETUS, Cope, spec. nov.

The tubercles and ridges of the cranium are obtuse and low, and the latter do not inosculate. An angular depression commences at the middle of each lateral area and extends across the middle line at the point of junction of the paired and single median scuta.

The external surface of the dentary bone is marked with short oblique grooves along its middle region; above these are grooves which inosculate, forming a figure like an open net dragged in the long direction. Excepting the grooves the teeth are smooth. The smaller ones are close together, and their crowns are curved backwards; the larger ones are at more remote intervals; both have enlarged bases; whether both forms are in the same series I cannot determine. There are from four to five of the smaller in an inch.

	M.
Depth of fragment of jaw (margin wanting) . . .	.075
Length smaller teeth	.019
" longer "	.023
Width of vertex at middle scuta	.176
" of paired median scuta	.056
" of single "	.036
Length of " "	.048

Some vertebræ were found at the same locality, but there is no evidence as to the species to which they may have pertained. They are short, concave on one end and probably so on the other. The centrum of one is .012 in. in diameter; neural arches injured.

The *Leptophractus* was about as large as a medium sized alligator.

CONCHIOPSIS, Cope.

This genus is represented by specimens of several species which all agree in the structure of the scales. These resemble those of the *Gyroptychius* of McCoy, in having longitudinal curved ridges, which converge to the posterior margin round an imaginary axis. A rather complete specimen which may be regarded as type, has two dorsal fins and one anal; neither these nor the ventrals are clearly lobate. The caudal fin is equally developed above and

below the tapering vertebral column. It is broken off in the type, but in another specimen is evidently quite elongate, and of the protocercal or isocercal type. There are two huge oval gular plates, as I suppose them to be, which are well separated from each other and of a broadly oval form.

In another specimen the dentition of one of the jaws is exhibited as a double series of small, subequal, subconical crowns. In still another the pectoral fin is displayed as broadly and obtusely lobate. Whether these all belong to the same genus may be uncertain, but their resemblance is very close. Size not large. The genus is evidently allied to the *Cyclodipteridæ*.

CONCHIOPSIS FILIFERUS, Cope.

About twelve rows of scales between the dorsal and ventral fins, which stand opposed to each other, and half way between the gular shields and the line of the equally opposite second dorsal and ventral. Sculpture of the gular plates, a longitudinal thread-like ribbing parallel to the inner borders.

	M.
Length from gular plates to anal fin	.057
Depth at D. 1	.038
" D. 2	.026

The type specimen was obtained and presented to me by my friend William Kite.

CONCHIOPSIS ANGULIFERUS, Cope.

Established on a specimen of larger size than the last species, but in which the scales are similar and therefore relatively smaller. The gular plates have a band of delicate ridges around their outer margins, and numerous ridges which diverge from the middle of the scale to the band. These ridges are undulate. Posterior to the plates on each side is a long incurved bone, perhaps the mandibular angle. The pectoral fin contains about thirteen radii. Prof. Newberry's collection.

CONCHIOPSIS EXANTHEMATICUS, Cope.

Established on a cranium entirely preserved as to its outline, with adjacent portion of space for chorda dorsalis and osseous ribs. The head is covered with thin scuta, which are very faintly sculptured with a few raised lines. The gular shields are oval and sculptured with elevated points, producing a weakly rugose sur-

face. The teeth above described are on this fish. There are six in three mm.

	M.
Width at shields	.055
" at middle muzzle	.030
Length of head	.045

Prof. Newberry's collection.

PEPLORHINA, Cope.

Established on a species similar to those of the last genus, but with a peculiar sculpture of the scales, which consists of raised points or small tubercles. There is a lateral line of tubes which I cannot find in *Conchiopsis*. An angular bony shield is present behind the gular scutum. There are well ossified ribs, but the structure of the fins cannot be made out at present.

PEPLORHINA ANTHRACINA, Cope.

Scales large, well imbricated; each one is .01 m. in elevation, and three enter .02 longitudinally. The gular and other scuta are smooth, except a band of shallow grooves round the margin.

	M.
Length of gular scutum	.021
" scute behind it	.014

From Prof. Newberry's collection.

DESCRIPTIONS OF NEW MARINE SHELLS FROM THE WEST COAST OF FLORIDA.

BY ROBERT E. C. STEARNS.

ANACHIS SEMIPLICATA, Stearns.

Shell small, solid, elongated-ovate; spire elevated, pointed; whorls 7–8; slightly convex, with inconspicuous revolving grooves, which latter become prominent on the lower portion of the body-whorl; upper portion of the basal, and a portion of the contiguous volution marked by 9–12 moderately sharp longitudinal ribs, which become obsolete on the lower part of the basal whorl, and inconspicuous or extinct on the upper whorls, varying in prominence in different specimens; suture distinct; aperture about half the length of the shell, white, narrow, widest and angulated above; outer lip simple, thickened near the middle, somewhat thickened, shouldered, and curved at its junction with the body-whorl, and nodosely ribbed within; inner lip calloused, callous thin, elevated, and finely tuberculated on its inner edge; canal short, moderately recurved. Number of specimens examined fifteen, of which the largest and smallest measure as follows:—

Fig. 1.

Length .55.	Length of aperture .25.	Breadth .20.
" .30.	" " .15.	" .12.

Most of the specimens were so coated as not to show the color; when cleansed the surface is of a light sienna-yellow, closely covered with white rounded spots, which frequently coalesce; apex generally eroded.

Habitat.—West Coast of Florida; most abundant at Charlotte Harbor, where Col. E. Jewett collected many specimens, also collected by myself at various points on the shores of Tampa Bay.

The species described herein belongs to a group of Anachids of the same general aspect, of which *A.* (*Columbella*) *avara*, Say, is an illustration. *A. semiplicata* differs from Mr. Say's shell in having a greater number of whorls, fewer longitudinal ribs, as well as in color markings, and other minor differences. Through

an insufficient comparative examination, specimens have been distributed with Mr. Say's name attached.

ANACHIS ACUTA, Stearns.

Shell small, slender, acutely fusiform; spire elevated, pointed, nucleus rounded, number of whorls eight; in some specimens slighly convex and traversed longitudinally by about fifteen nearly equidistant prominent rounded ribs, which are absent on the apex and adjoining whorl, and become obsolete just below the periphery of the basal volution, which is somewhat angulated below and at its anterior portion marked distinctly with transverse costæ; in some specimens the longitudinal ribs show a tendency to nodulation, and terminate rather abruptly upon the periphery of the body-whorl; suture profound, cutting the ribs abruptly; aperture one-third of the length of the shell, whitish, narrowly ovate, angulate above; outer lip simple, moderately thickened; slightly shouldered and curved above, with 5–7 denticles within, which regularly decrease in size anteriorly; inner lip showing a thin polished callus, with, in some specimens, a slightly produced edge; anterior canal short, moderately curved. The shells of this species are quite variable in color, some individuals being of a porcellanous white, with transverse sienna lines and lighter or darker blotches of the same color; others are of a light sienna-yellow, with whitish blotches and brown linear markings. The following are the dimensions of the largest and smallest specimens:—

Fig. 2.

Length	.26.	Length of aperture	.09.	Breadth	.08.
"	.23.	" "	.08.	"	.09.

Habitat.—West Coast of Florida, at Egmont Key, where several specimens were collected by my friend E. Jewett, Esq. It seems to be rather restricted in its distribution, and much less numerous than *A. avara* or *A. simplicata;* while the number of ribs is the same as in *A. avara*, the shell being much slenderer, these ribs are much nearer to each other, and the surface is destitute of the revolving grooves which characterize that species.

NITIDELLA FILOSA, Stearns.

Shell small, acutely conic, spire elevated, apex rounded; whorls five, convex; suture distinct; surface white, traversed by numerous equidistant fine revolving grooves; body-whorl one-half to

three-fifths, and the aperture about one-fourth the length of the shell; mouth ovate, outer lip simple, internally ribbed, thickened at its upper part, turned and reflected upon the body-whorl, forming a callus on the upper portion of the columella, which latter is rather abruptly shortened and slightly twisted anteriorly.

Fig. 3.

Length .16. Length of aperture .06. Breadth .06.

Habitat.—West Coast of Florida, on the shores of Tampa Bay, collected by Col. E. Jewett. Only a few specimens were obtained, of which three are in my cabinet. All the specimens examined by me were beach shells, without opercula, consequently the generic position is somewhat doubtful. This species has apparently relations with *Nitidella* (*N. cribraria* or *N. guttata*), also with *Truncaria* (*T. eurytoides*), but as these genera at present include many incongruous species, a revision is necessary before this and similar forms can be satisfactorily placed. The genus *Nitidella* was made by Swainson (*vide* "Treatise on Malacology," pp. 151–153–313) on the *Columbella nitida*, a West Indian shell, with a short spire, long body-whorl, and a plait on the columella, a markedly different form from *N. guttata* or *N. cribraria*, which are generally included with it. There are numerous allied forms in this connection, which approximate so closely that an examination of the opercula is indispensable to generic determination. (*Vide* remarks of Mr. Dall in Am. Journ. Conch., vol. vii. p. 115.)

CLATHURELLA JEWETTI, Stearns.

Shell small, abbreviated fusiform, turreted, of a dull ashen-reddish color when dry, dark-reddish to purplish when wet; number of whorls six or seven, convex and somewhat flattened above, sculptured with eleven or twelve prominent longitudinal ribs, which extend nearly or quite to the base of the body-whorl; longitudinal ribs crossed by ten to twelve strong thread-like lateral costæ, which at the points of crossing are in some specimens produced into rounded nodules; the upper whorls show three to four of the lateral costæ, generally three; aperture narrow, about half the length of the shell, of a purplish-black or dark-chocolate color; outer lip thickened and deeply notched above; columella nearly straight, calloused; terminal canal short.

Fig. 4.

Measurements of four specimens as follows:—

Long. .30 inch.	Lat. .14 inch.
" .28 "	" .12 "
" .24 "	" .11 "
" .24 "	" .10 "

Habitat.—Rocky Point, Tampa Bay, West Coast of Florida, where I collected four living specimens from off the underside of clumps of oysters; also at other points along the shores of said bay and the adjacent keys, by Col. E. Jewett, who obtained many specimens. It is perhaps the most common of the pleurotomoid forms of the above region.

AUGUST 5.

The President, Dr. RUSCHENBERGER, in the chair.

Ten members present.

AUGUST 12.

The President, Dr. RUSCHENBERGER, in the chair.

Six members present.

AUGUST 19.

The President, Dr. RUSCHENBERGER, in the chair.

Fourteen members present.

The death of Elias Durand and Dr. L. S. Bolles was announced.

The Composition of Trautwinite. By E. GOLDSMITH.—The very small quantity of the substance I had for the first examination of the above-named mineral (see Proceedings of the Academy, Jan. 1, 1873) caused me to overlook a few important elements, namely, silica and lime.

John C. Trautwine, to whom my thanks are due for procuring more of the substance, has ascertained that the locality of it is Monterey County, California. The mechanical separation of the Trautwinite from the chromite is a difficult and tedious operation; however, I succeeded so far, that with the lens no black particles of chromite could be discerned.

As the substance is insoluble in acids, I brought it into the soluble condition by fusing it in a mixture of carbonate of soda and saltpetre, treating the fused mass with water until all the soluble parts were exhausted, and the insoluble part with hydrochloric acid. What the acid had not dissolved was again fused with soda and saltpetre, and the obtained mass treated the same as before. From the alkaline solution, after acidulation and reducing the chromic acid to sesquichloride of chromium by hydrochloric acid and alcohol, I separated first silica, then the sesquioxide of chromium.

The other solution, containing the bases as chlorides, was evaporated to dryness, moistened with hydrochloric acid, water added, and thus I found another small quantity of silica. The alumina and iron were then separated from the lime and magnesia by ammonia; but the iron and alumina were again dissolved and

precipitated as before to insure a perfect separation from the lime and magnesia. From the mixed liquor containing the alkaline earths the lime was removed as oxalate; the magnesia finally—after expelling the ammoniacal salts—as ammonio-magnesia phosphate. The iron and alumina were separated by caustic potassa. The iron also in this case was redissolved, and again thrown down with an excess of caustic potassa to render the separation of the alumina as complete as possible. After carefully washing the iron, etc., the alumina was separated from the alkali in the usual way.

The result of the analysis is as follows:—

Silica	(Si̇)	= 21.78 %.
Sesquioxide of chromium	(Ċr)	= 38.39 "
" iron	(Ḟe)	= 13.29 "
" aluminum	(Ȧl)	= .81 "
Lime	(Ca)	= 18.58 "
Magnesia	(Mg)	= 7.88 "
Loss on ignition		= .11 "
		100.84

By comparison between the silica and the other oxides, I found the ratio to be as 1 : 2.4 nearly; that is, when the sesquioxides and the monoxides are added together in their respective equivalent quotients. But if the quotients of the added sesquioxides and the quotients of the added monoxides are compared with the equivalent quotient of the silica, then the ratio of the silica to the sesquioxides and to the monoxides is as 1 : .9 : 1.4.

These figures could be used for a complicated formula, which, however, I omit, because it would not give any more correct idea of the combination.

Finally, I am aware that this mineral has been erroneously called ouvarovite, which, as is well known, is a variety of garnet.

To show the difference in the composition of the two minerals I give the results of O. L. Erdman's analysis of ouvarovite and the composition of the new species Trautwinite:—

	Si̇.	Ȧl.	Ḟe.	Ċr.	Ṁg.	Ca.
Ouvarovite,	36.93	5.68	1.96	21.84	1.54	31.63
Trautwinite,	21.78	0.81	13.29	38.39	7.88	18.58

That these minerals are widely different from each other is readily seen in the two lines of figures; besides this we have also the difference of form, garnet being isometric and Trautwinite hexagonal. I endeavored repeatedly to project upon paper, through the camera lucida, points for measuring angles of the new mineral, but the results varied so much among themselves that they were not fit for publication.

AUGUST 26.

The President, Dr. RUSCHENBERGER, in the chair.

Sixteen members present.

SEPTEMBER 2.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

SEPTEMBER 9.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-eight members present.

Mr. GENTRY communicated a notice of a great swarm of ephemerids which passed through the town of Lewisburg, on the Susquehanna River, on the afternoon of the 22d of August. The swarm was estimated to be about a mile in length by nearly a half mile in width, and was so dense as even to obscure passers-by on the opposite side of the street.

SEPTEMBER 15.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following papers were presented for publication: "On a new American species of Glyptocephalus." By Theo. Gill. "Description of fifty-two species of Unionidæ." By Isaac Lea.

The last-named paper was, on report of the committee, ordered to be published in the Journal of the Academy.

SEPTEMBER 23.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

Exceptional Conditions in the Vegetation of Forest Seed.—Mr. THOMAS MEEHAN, in reference to the distribution of the Coniferæ of the Rocky Mountains, said, that in any forest it must have

struck observers that the trees were all pretty much of one age. Here we see a piece of forest in which the trees might be one hundred years old; there another perhaps fifty; and again young ones of from ten, twenty, and so on. They are, however, generally of one age, and though there are some younger trees of various ages scattered through, the great bulk of each forest started from the seed in the same season together. It was remarkable that of the immense amount of seeds annually produced by forest trees, how few of them grew. In the forests we found, as a rule, few seedlings, and though the boundaries of a piece of woodland might not be under cultivation, so as to destroy any vegetating seeds, the forest boundaries were seldom enlarged in any gradual way. In the woods about Philadelphia, the American white oak was not particularly abundant. Here and there were a few trees in almost every piece of wood; and though the trees bore acorns only every other year as a rule, yet in the bearing season they were more abundant than in most other species; yet young ones were so scarce that if the forests were cut away three years ago, the succession would not be remarkable for *Quercus alba*. But in 1872—the productive year for the acorns—there was something so favorable to their vegetation that seedlings now abound in these woods, and if the growing timber were now cut away, so as to give these seedlings a fair chance for life, the future forests of this part of Pennsylvania would be especially of white oak—as distinctly a white oak region as some parts of our country are famous for their pines. We see, however, from this that it is only at special times and under special circumstances, that seeds grow to any great extent in our comparatively favored forest region, and we can understand better the fact referred to, of forests generally having the mass of their timber trees about of one age.

Carrying these facts with us, we may understand some of the phenomena accompanying the forest distribution in the far west. Along the Rocky Mountain range, as well as in the Wahsatch and Uintas, the prevailing deciduous tree, or rather shrub (for it is scarcely a tree), is what has been supposed to be a variety of Quercus alba (var. *Gunnisonii*) by some, and by others a variety of Q. Douglassii (var. *neo-Mexicana*), but which I believe Mr. Watson has recently made a distinct species under the name of *Q. polymorpha*, an excellent name when the many varied forms are considered. It is unusual to find it growing in dense thickets. Generally it is in clumps of from five to twenty-five or more feet in diameter. Each clump has evidently started from one seed at some one time; and from one stem, underground suckers proceeding a few inches each season, have made the mass of stems as we see them. One could almost tell the age of the clump by the graded heights of the mass, the tallest of course being in the middle, and the outside often but a few inches, being the most recent growth. In this way the mass of varied characters becomes very striking.

If the parent plant be cut leaved, of course the whole is a cut-leaved clump. If entire leaved, we have an entire-leaved clump. If not of very vigorous growth, we have a clump of vegetation not more than two or three feet high; and then we have a mass of vigorous growers; one of the latter in Cheyenne Cañon, south of Pike's Peak, he saw with numerous little trees, perhaps thirty feet high, and stems two feet in circumference. There appeared nowhere, in his many hundred miles of travel, any young seedlings; indeed no plants anywhere that were probably less than twenty-five years old; and yet, in both of his visits to these regions, the plants were bearing acorns in the greatest abundance, and evidently bore in this way every year.

The coniferous trees of this region present the same appearances. Of some species young ones are rarely seen. This is especially true of Pinus ponderosa, which is perhaps more widely distributed through the Rocky Mountains than any other. The greater number of these trees are between one and two hundred years old. A stump of one of the largest cut down in Williams' Cañon, near Colorado Springs, had 216 concentric rings. Young broods of perhaps ten or twenty years old are occasionally seen, but not often. The young broods throughout the region between Gray's Peak and Pike's Peak are chiefly of Pinus contorta, or, as it ought perhaps to be more properly called, Pinus Balfouriana. Sometimes hundreds of acres of perhaps ten, twenty, or thirty years would be met with, but always of the same age in one district. Of course, where this species follows *Populus tremuloides*, as it often does when the poplar has been burned off, it is easy to understand how the pines may be all of one age; but the uniformity is the same whether the pines follow a burned district or not. Abies grandis affords the greatest irregularity in ages; but this, so far as his observations went, made no separate forests, but were mostly mixed with other species, chiefly with Abies Douglassii, Abies Mensiesii, or Abies Engelmannii. The general rule was evident everywhere, that only on special occasions, and these apparently often at long intervals, did a crop of young coniferous trees appear.

These facts being gained, we can understand at least some of the influences at work to prevent the spread of timber on the prairies from the trees growing along the river banks, or on to the low lands from the timbered regions on the heights. If under the most favorable conditions in the East, and on the cool slopes of mountains, it is but occasionally that the seeds find a conjunction of elements favorable to successful growth, how much more rare must these circumstances be on a dry, hot prairie? Seeds may fall for ages along the line of a river, and yet not a tree be found a hundred yards from the river line.

He thought, also, the facts would account for what is known as the timber line in the Rocky Mountains. This was not an arbitrary division, decided by mere altitude, as was popularly supposed;

but depended on the favorable or unfavorable circumstances under which seeds in certain seasons found themselves. The ascent of Gray's Peak by the way of the Clear Creek Cañon afforded an illustration. At the base of the mountain, we find Pinus contorta, P. ponderosa, Abies Engelmannii, and a few Abies grandis. As we advance all disappear except Abies Engelmannii, but Pinus aristata takes the place of the departed ones. Advancing higher, P. aristata disappears, and only A. Engelmannii is left for the last half mile before reaching the "timber line." The last series of trees appear about fifty years old, even to the boundary line, and then comes perhaps a half mile of Juniperus alpina, Salix arctica, and other small growing things. But on examining this mass of scrubby growth, a large quantity of Abies Engelmannii, not more than a couple of feet high, about twenty years of age, and seemingly never to be anything more than scrubs, is found growing with it. An examination of the forests at lower altitudes, however, shows that Abies Engelmannii, even at a thousand feet below, made its first twenty or thirty years in a similar scrubby condition. It was no uncommon thing to find specimens of this tree perhaps sixty feet or more in height, when clothed with branches to the ground, to have the early branches at the ground still remaining, and in just the same condition as those above the "timber line." The same thing occurs in American nurseries with some firs. Picea pectinata generally remains in this semi-stunted condition for ten or twenty years, losing its leader annually, spreading its side branches, but increasing its trunk at the ground, and its tap-root in length. After that it ascends rapidly, its leading shoot seldom being destroyed afterwards. He saw no reason, as Gray's Peak was not one of perpetual snow, except perhaps in some of the deepest ravines, why under favorable seasons for germination, Abies Engelmannii might not in time advance towards the top, without regard to any arbitrary "timber line."

The facts he offered were he thought worthy of attention by those interested in the geographical distribution of plants. Most forest trees seeded abundantly every year, and yet nature seemed to have placed some check on the ultimate perfection of her own great work. And indeed we could see the wisdom of this check; for if the seeds of these strong forest trees were to grow as readily as the seeds of the smaller annuals, the world, in the absence of man to cultivate, would have its smaller vegetation crowded out, and it would be one vast forest; and yet it seemed an enigma that nature should produce such an immense amount of seed with one hand, only to be destroyed by the other, unless we accept this principle, that seed growth is only occasional and exceptional to any great extent, and then we see how essential it is always to have a large and fresh stock constantly on hand, as a seedsman would say, so that advantage could be taken of the exceptional conditions when they occurred.

Malformed Red Clover.—Mr. THOMAS MEEHAN also presented some specimens of a malformed clover, *Trifolium pratense*, handed to him by a fellow member, Mr. Isaac Burk, with the request to bring it to the notice of the Academy if of interest.

The flowers, usually sessile, were in this case elevated on pedicels about an inch long, and from these, what should normally be the gynœcium, was again developed into a short pedicel bearing a calyx, one of the segments of which, usually little more than a mere cilia, was developed into a complete leaflet. The case afforded no light on morphological law beyond what was already known; but the fact that the Red Clover grew in this way, had not, he believed, been recorded.

Mr. GENTRY made the following remarks regarding the nest of Vireo solitarius, Vieil.

Audubon, in describing the nest of Vireo solitarius, Vieil., affirms it "is prettily constructed and fixed in a partially pensile manner between two twigs of a low bush, on a branch running horizontally from the main stem, and formed externally of gray lichens, slightly put together, and lined with hair chiefly from the deer and raccoon." My experience has been quite different. Out of the many nests which I have seen and examined, I cannot recall a single specimen that will answer to the above description. I have five nests of this species, four of which are perfectly similar in structure; the remaining one formed of the culms of a species of *Aira*, constituting an exceptional case, and the only one that has ever fallen under my notice. They are all shallow, loose in texture, scarcely surviving the season for which they were designed, and placed between two twigs of a cedar or a maple tree at a considerable elevation from the ground, on a branch nearly horizontal to the main axis. They are built entirely of clusters of male flowers of *Quercus palustris*, which, having performed their allotted function, don their brownish hue at the very period when they can be utilized.

Here is evidently a change within a moderately short period, rendered necessary by external causes. This necessity may have grown out of inability to procure the favorite materials, or a desire for self-preservation. In the case of the species under consideration, it cannot be denied that the utter inability, without unnecessary physical effort, to procure the hair of the afore-mentioned animals, particularly in sections where *they* have been compelled to retreat before the advance of man, may have been one of the causes which have induced the change. I am satisfied, however, that it has not been the leading one, but that self-preservation has operated in this case for individual and family good. The adaptation of the colors of the female bird to the tints of surrounding objects, during the trying period of incubation, and the establishment of certain resemblances to familiar external objects are two of the ways in which it manifests itself.

SEPTEMBER 30.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following were elected members: Wm. F. Riddle, Joseph Neuman, Apollos W. Harrison, J. B. Howell, De Forrest Willard, M.D., L. S. Clark, M.D., Andrew Macfarlane, A.M., C. J. Hoffman, and Mrs. Louisa J. Roberts.

Frank Guckert, of Ciudad Bolivar, Venezuela, was elected a Correspondent.

In compliance with a resolution of the Academy, Mr. MEEHAN read the following:—

OBITUARY NOTICE OF ELIAS DURAND.

In an institution like ours, devoted wholly to the study of the natural sciences, it is meet, when a distinguished member passes away, that we pause to ask ourselves what science has gained by his illustrious career; and, by reviewing the details of his useful life, derive new encouragement to press onwards in our studies. Thus shall the good which a man doeth live after him; for surely of all men the scientist liveth not in vain.

We are proud that in the history of science so many members of our body hold a distinguished place. Among these great names, that of our late associate, Elias Durand, will always be gratefully remembered. He was elected a resident member of the Academy in 1852, and his whole life has been one of continuous devotion to science.

Elias Durand (Elie Magloire Durand) was born in Mayenne, France, on the 25th of January, 1794, where his father, André Durand, was recorder of deeds, and in which Elias, the youngest of fourteen children, received his education. In 1808, he commenced a four years' study under M. Chevalier, eminent as a pharmacien and scientist, and to whose kindly interest in his success, Mr. Durand was fond of attributing his successful course in life. In the fall of 1812, he arrived in Paris and attended the scientific lectures of Thinard, Gay-Lussac, Lefevre, and Ginault, and a course on general literature by Andrieux. He received a commission as assistant pharmacien, and after examination, was complimented by M. Parmentier, Inspector-General of the Pharmaceutical Department of the Army, by being placed on the head of the list of applicants, and soon was ordered to join the 5th corps of observation on the Elbe. He presented his commission

to Field-Marshal Kellerman, and joined the army immediately at Magdeburg. He participated in most of the battles which followed, taking part especially in the bloody one at Leipsic. At the battle of Hanan, he was one of about a dozen who succeeded in crossing a stream, out of some hundreds who were killed or wounded in the attempt, and was captured by the enemy; but the officer in charge, in pity at the awful destruction which had left so few, suffered them to go free after a short detention. On the downfall of Napoleon, he resigned his commission, notwithstanding the opposition of his Chief, M. Lodibert. Years afterwards, when this distinguished gentleman was President of the Pharmaceutical Society of Paris, he remembered the former young man of twenty, but now in the United States, and proposed his name in a highly complimentary manner for membership in that institution. Leaving the army, he entered the drug store of M. Fretand, at Nantes, directed the chemical manipulations in the apothecaries' garden, and lectured to the students on medical botany. On the return of Napoleon he at once rejoined the army, and served during the celebrated one hundred days, as one of the National Guards. On the 15th of June, came Waterloo, and on the 26th, the allies entered Paris. Durand, with his strong Napoleonic tendency, was continually under surveillance, to escape which he sailed for the United States, arriving at New York on the 1st of July, 1816. Proceeding to Boston, Bishop Chevrus, a distant relative, introduced him to the leading scientists of that city, and he became superintendent of the chemical laboratory of a Mr. Perkins. After a few months, considerations of health led him into a similar position with a Mr. Wesner, at Broad and Race, in Philadelphia, but he found it necessary soon after to abandon this pursuit, and devote himself to pharmacy exclusively.

After a short residence near Baltimore, he obtained a letter of introduction to Dr. Troost, who at that time was engaged in the manufacture of alum and sulphate of iron, but who lived at Cape Sable, twenty miles away. Mr. Durand's diary gives a graphic account of this journey, made on foot, in deep snow, through a dense pine forest, in the depth of winter, and with but two houses on the whole track, one of these a country inn filled with pictures of murders of whites by red-skins, and other phases of Indian life. He tells of his subsequent meeting with Indians; his fear of his life, but found kind treatment from them; his taking the wrong trail in the dark, and finding and stopping over night at a farm-house, and of the kind treatment he received there, ending in his being sent under care of a slave to Dr. Troost's the next day. Notwithstanding what he had formerly been through, this little circumstance seems among the most impressing events of his life. He describes Dr. Troost as a gentleman of very primitive appearance, leading a sort of backwoodsman's life, but ex-

hibiting the most unbounded generosity and kindly feeling. He could not assist him in getting employment, but he urged him to make his home with him for a while, as "he was much in need of some educated person to talk with." He spent two months with Dr. Troost, and there is little doubt but that this incident tended to confirm his already decided taste for natural history. By the influence of Dr. Troost, he became chief clerk in the establishment of Mr. Ducatel of Baltimore, whose daughter he ultimately married. Mrs. Durand died in 1822; and his daughter, the only child by this marriage, in 1836.

In 1823 Mr. Ducatel retired from business, leaving it to his son Jules, afterwards professor of chemistry in the Baltimore Medical School, and State Geologist of Maryland, and he took Mr. Durand into partnership with him. At the end of the year he withdrew from the partnership with the view of opening a store in Philadelphia. He went to France, returned to New York in April, 1825, and immediately after opened his store on the southwest corner of Sixth and Chestnut, in Philadelphia, which ultimately became one of the most distinguished pharmaceutical establishments in this country. His interest in his business was not merely that of a trader; he carried into it the same love of science which endears his memory to us to-day. The first contribution to the Journal of Pharmacy was from his pen; and the catalogue of the Royal Society of London gives a long list of valuable papers contributed by him to various magazines and institutions, on matters connected with this branch of science.

To us he will ever be remembered as a botanist. During all the long years referred to, his devotion to this department of natural history never flagged. His store was the resort of the most intelligent; and botanists sat at his right hand. His purse assisted many a botanical traveller; and thus it was that the collections of Nuttall, and many other valuable herbariums fell into his hands. They did not however always come to him in this direct way. He loved to tell of his being told of a lot of plants which had been stowed away in a loft for many years, and which he could buy cheap; and after paying little more than the price of waste paper, he found to his surprise that it was the herbarium of Rafinesque, which for so long a time had been the home of innumerable rats. His pains-taking accuracy and industry had early gained him a reputation; and a wealthy young gentleman of Ohio, determining to study botany, and anxious to purchase a herbarium to begin with, was referred to Mr. Durand, who sold his to him at ten cents a species, amounting to about $1000, which will give some idea of the extent of his labors at that time. His own distant collections were not numerous, but in 1837 he made an extended exploration of the Dismal Swamp in Virginia, and in 1862 another through the mountains of Pennsylvania. Shorter excursions with Count Survilliers, Joseph Buonaparte, and other eminent scientific men were numerous.

In 1852 he retired from business in order to devote the remainder of his life to botanical science. His first great work was to add to the berbarium of our Academy desiderata which his own could supply. In this way we came into possession of a large number of Nuttall's plants, besides numerous others. Indeed, the North American Herbarium of the Academy, as it now stands, is mainly the work of Mr. Durand. While in Europe in 1860 he found the herbarium of the Garden of Plants at Paris deficient in North American species, and on his return devoted much of his time to preparing his collection for that institution. He took the major part there in 1868, and left by his will the balance to it, making in all about 15,000 species, in which institution they will be preserved separately as the *Herbier Durand.* He presented his botanical library to the Academy of Natural Sciences, and his library of chemical and pharmaceutical works, together with a herbarium of medical plants, to the College of Pharmacy.

The first great contribution to botanical literature after his retirement from business in 1852 was the "*Plantæ Prattenianæ Californicæ*," published in the Journal of the Academy in 1855–58, and about the same time in the same volume "*Plantæ Kaneanæ Grœnlandicæ*," being the plants of Kane's two voyages to the arctic regions; and also during the same period, in connection with Dr. Hilgard, in the same journal, the "*Plantæ Heermannianæ*," being the collections of Dr. Heermann, the naturalist attached to Lieut. Williamson's survey of the Pacific Railroad. In 1860 the botany of the Salt Lake of Utah, in Am. Philos. Transactions. In 1861 he gave in the Proceedings of the Academy an account of the Arctic plants of Hayes's expedition; and in 1862 an article in the Bulletin of the Paris Acclimatization Society on the vines and wines of the United States, which attracted much attention in Europe. He is also the author of a memoir of André Michaux, and also of his friend Nuttall, which, from his intimacy with this great botanist, he was enabled to make the best one written.

For two years past age seemed to tell on him rapidly, and his regular attendance on his appointed and much loved duties in the Academy was broken up. During the past year his brain gradually softened, until, on the 14th of August, 1873, he peacefully passed away, in the 79th year of his age, leaving an only son by a second marriage, who has already distinguished himself in one branch of his father's favorite studies; and a memory which we, his associates in this Academy, will long, gratefully, and fondly cherish.

From such a life how much the world may learn! Here is a young man surrounded by difficulties, but who was never appalled or turned aside from the zealous pursuit of knowledge. It did not interfere with his business success, as it is a popular fallacy such studies tend to do, but it aided him to the highest eminence in his profession. It brought him into contact with many kindred spirits in this and similar institutions, which in turn fanned his

enthusiasm, and added to the great pleasure he took in life. His benevolent spirit overflowed wherever the wants of man were to be relieved; and in the added facts to science, he knew, as we all know, that he was bequeathing a legacy to posterity which would benefit it for all time to come.

On report of the committee the following paper was ordered to be published:—

ON A NEW AMERICAN SPECIES OF PLEURONECTOID (GLYPTOCEPHALUS ACADIANUS).

BY THEODORE GILL, M.D.

In the "Proceedings of the Academy of Natural Sciences of Philadelphia" for 1864 (pp. 214–224), was published a "Synopsis of the Pleuronectoids of the eastern coast of North America," in which two generic types, either entirely new (*Euchalarodus*) or new to the coast (*Citharichthys*), were made known. The present article may be regarded as supplementary to that.

The only known specimen of the new type was obtained from a pond at Eastport, Maine, during the month of August, by an attaché (Dr. Edward Palmer) of the Commissioner of Fisheries (Prof. Baird), and, notwithstanding the assiduous attentions of the commissioner and his staff, no other specimens were found; it must, therefore, be actually a very rare fish, or (what is more probable in such cases) peculiar in its habitat, and rarely coming within the range of operations of the fisherman.

An attentive examination and comparison of this species with the *Glyptocephalus cynoglossus*, of Europe, indicate that it is congeneric with that species and with the *Platessa elongata* of Yarrell, but more nearly allied to the latter. As the genus is now for the first time introduced into our fauna, a description of the characters common to all the species (generic), as well as distinctive of the new form (specific), is given.

Genus GLYPTOCEPHALUS, Gottsche.

Synonymy.

Glyptocephalus, Gottsche, Archiv für Nat. 1835, i. p. 156; Blkr., Compt. Rend. Acad. Sci., Amsterdam, xiii., 1862.

Body oblong fusiform, with the caudal peduncle abbreviated.

Scales minute, oval, cycloid on the eyed as well as blind side, and regularly imbricated.

Lateral line straight, with its scales covered on both sides by the adjoining ones.

Head small, ovate, the profile being slightly decurved, and with the rostral area rhomboid; covered with minute imbricated scales on the cheeks and opercular bones; on the blind side exhibiting

foveæ or pits in the cranium and preoperculum; orbital ridge prominent, narrow, and curved upwards towards the lateral line (with no bony tubercles).

Eyes moderate, approximated, the upper (in typical species) somewhat further back than the lower, mostly in the anterior third of head.

Nostrils of the eyed side parallel with the axis of the body; the posterior patulous, and above the supraorbital crest; the anterior tubular, and near the border of the snout; those of the blind side in an oblique row; the posterior patulous; the "anterior" tubular.

Mouth very small, with the cleft very oblique, deeper and less oblique (the supramaxillary being longer) on the blind side. Lower jaw scarcely prominent, with a declining obtusely angular (not tuberculated) chin.

Lips moderate and simple, free all around.

Tongue small and scarcely free.

Teeth fixed, uniserial, on the blind side approximated and with compressed squarish crowns; on the eyed side (1) similar or (2) more distant and obtusely conic. (Palate unarmed.)

Branchial apertures closed above the opercula, with the membrane free below.

Branchiostegal rays seven.

Dorsal fin with its rays simple, in large number (100–120); with its origin above the middle of the upper orbit, with the foremost and hindmost rays (when at rest) converging, and the rest erect.

Anal fin with its rays simple, in large number (90–105), with its foremost and hindmost rays converging, but the rest erect; preceded in front by a well-defined spur-like spine curved forwards.

Caudal fin convex or angulated behind.

Pectoral fins small, obliquely rounded behind, and with branched rays.

Ventral fin subbrachial, normally developed.

Type, Pleuronectes cynoglossus, *Linn.*

This genus is well distinguished by the elongated and compressed body covered by cycloid scales, the straight lateral line, the small head with its well-defined foveæ (showing through the scaly skin) of the cranial and preopercular regions, the numerous dorsal and anal rays, and the preanal spur-like spine. Three

species seem now to be referable to the genus: (1) the typical species (*G. cynoglossus* = *Pleuronectes cynoglossus*, Linn); (2) a rare British form (*G. elongatus* = *Platessa elongata*, Yarrell), and (3) an undescribed species peculiar to the Acodian province of naturalists (*G. acadianus*, Gill). These appear to represent two sections of the genus; the first species one, and the second and third another.

GLYPTOCEPHALUS ACADIANUS, Gill.

The height of the body enters about $2\frac{1}{5}$ times in the length, exclusive of the caudal ($3\frac{1}{4}$ in the extreme length); the height of the caudal peduncle is little more than $1\frac{1}{4}$ of its length. The head enters $5\frac{1}{4}$ times in the length.

The teeth are decidedly unlike on the respective sides, those of the blind side being close set, with incisorial edges, about 17 in the upper jaw, and 20 in the lower; those of the eye side distant, obtusely conic, 6 in the upper and 7 in the lower jaw. The greatest height of the dorsal equals about half the length of the head, as does also that of the anal. The caudal fin enters about $5\frac{1}{2}$ times in the *extreme* length. The pectoral fin (of the dark side) is considerably more than half the head's length, and the ventral considerably less than half; the base of the ventral is under that of the pectoral (but a little further advanced).

D. 110, A. 100.

The color is rufous-brown, immaculate.

The single specimen, from which the above description was taken, was apparently not full grown, and, as already remarked, was obtained from a net at Eastport, Maine.

The species is evidently congeneric with, and closely related to, the *G. elongatus* (*Platessa elongata*), of which an incorrect figure is given in Yarrell's work, and (in some respects) a more accurate one in Couch's History of British Fishes; it is, however, less elongated and the head larger.

OCTOBER 7.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-three members present.

Law of Seed Germination in Swamp Plants.—Referring to a few brief remarks of Mr. Aubrey H. Smith, on a former occasion, in regard to the naturalization of *Taxodium distichum* on comparatively dry ground in the Northern States, Mr. THOMAS MEEHAN said that it was an error to suppose that nature placed trees in places the best suited to their growth. Almost all of our swamp trees grew much better when they could get into dryer places, if in ordinary good land. He referred among others to Magnolia glauca, Acer rubrum, Celtis occidentalis, Ilex opaca, Cupressus chamæcyparis, Cephalanthus occidentalis, Salix babylonica, especially as, within his own repeated observations, growing better out of swamps than in them. Why it was that they grew in swamps was no enigma to those in the habit of raising forest trees from seed. It was found that seeds of these trees would only germinate in damp places, and, of course, in a state of nature the tree had to remain in the place where the seed germinated.

He thought the principle taught that plants required water to grow well was true only in so far as a humid condition of the soil was concerned. Plants, as a general thing, though they were of the class known especially as water plants, preferred to grow out of the water, except in those which grew almost entirely beneath the surface. He had found such plants as Polygonum amphibium and some of the water-loving Ranunculi, grow much more luxuriously in the terrestrial than in the aquatic state. As was well known, the Taxodium distichum in the southern swamps sent up "knees" from various points as the roots extended, often as large as old-fashioned bee-hives, and several feet above the surface. He had observed that not only were the cypress trees at least as large and luxuriant when growing in good, rather dry ground; but the tendency to throw up these knees was in a measure lost. They were generally small, but often wholly wanting. With the general facts before us of the antipathy of swamp plants to their watery fate, he thought one might be safe in concluding that these root excrescences were the result of an effort of the plant to counteract the law which, against its own desires, to speak metaphorically, had found itself obliged by the necessities of its law of seed germination to be a denizen of a swamp.

Mr. AUBREY H. SMITH said: In connection with the observations of Mr. Meehan, I think it worth recording that a few years ago I

collected some plants of *Talinum teretifolium* Pursh, on the serpentine rocks of Chester County, near Westchester, and transferred them to the small garden in the rear of my house in this city. The place chosen for them was close to the hydrant, where the very rich soil was constantly in a humid condition. The plants throve greatly, producing flowers and perfect fruit in abundance, and extending their tuber-like roots on all sides. In the early spring, observing these roots half-exposed on the surface of the ground, I pressed them down with my finger and covered them with earth. The plants continued to thrive and multiply in this situation for several years, forming a thick mat of considerable extent, with no further care than the occasional covering of their roots in the spring. Subsequently they were superseded by *Helonias bullata*, for which their site was the best in my possession. This, however, bloomed but feebly and died in the early heat of the next summer.

When we consider that *Talinum teretifolium* grows only on dry rocks and, in Pennsylvania, is confined to the ledges and fissures of the serpentine, seeking, as it were by preference, the poorest and dryest soils, it affords a striking illustration of the truth of Mr. Meehan's remark that nature does not always put plants in places most suitable to their growth. What condition essential to the perpetuation of this plant exists in the arid serpentine, I am not able to state. It may concern the germination of its seed or the protection of its fleshy roots. It certainly does not govern its nutrition and fructification.

OCTOBER 14.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

On Distoma hepaticum.—Prof. LEIDY stated that he had received a letter from Prof. Gross, inclosing one from Dr. J. G. Kerr, of Canton, China, asking information in regard to a worm accompanying the letter. Dr. Kerr observes that the worm was vomited by a Chinese boy, aged fifteen years, and was brought to him an hour after its expulsion, when it was still alive. It had the appearance of a leech, was red in color, about an inch and a half long and three-fourths of an inch where widest. Dr. Kerr also states that a girl, of four years, of English parents, living in Canton, passed from the bowels at one time nine of these worms. With these exceptions, Dr. Kerr had not met with any one who had ever seen or heard of anything of the kind.

Prof. Leidy exhibited the specimen and expressed the opinion that the worm was a Liver-fluke, *Distoma hepaticum*, a rare parasite in the human subject, though common enough in cattle, espe-

cially sheep, in which it caused the disease called "rot." The worm exhibits some differences from *D. hepaticum* as usually described, but perhaps not sufficient to characterize it as a distinct species. The specimen is preserved in strong alcohol, which no doubt has much contracted and reduced it in size, but it is yet rather larger than the size assigned to *D. hepaticum*. It is perfectly smooth throughout, and exhibits no trace of roughness to the integument. It is ovate-lanceolate in form, and gradually widens from the anterior to the posterior rounded extremity. The ventral acetabulum is twice the size of the mouth, and is situated about its own diameter behind it. The genital orifice with the exserted spiral penis is placed just in advance of the ventral acetabulum. The measurements of the worm in its present condition are as follows: Length 17 lines, width at the posterior third 7 lines, thickness near centre 1 line, diameter of mouth $\frac{2}{5}$ths of a line, diameter of acetabulum $\frac{4}{5}$ths of a line.

Prof. Leidy further remarked that Dr. Keyser, of this city, the evening previously had brought to him for examination a worm, which was stated to have been removed from the cavity of the nose of a patient. He recognized the worm as a rat-tail lava, apparently of the genus *Eristalis*, and inquired of those members interested in entomology, if they had ever known this insect to be found as a parasite in the human body. Both Drs. LeConte and Horn said that they had never heard of this genus being parasitic.

Analysis of Chromite from Monterey County, California. By E. GOLDSMITH.—No analysis of chromite from this locality, so far as I am aware, has yet been published. Mine was undertaken with the view to ascertain what particular relation it might have to Trautwinite. As the last-named mineral is found on it, I presumed that the latter might have originated from the former. A chemical analysis only could decide the question. The process pursued was in all respects the same as that followed in my previous investigation of Trautwinite; not omitting great care in the preliminary mechanical separation of the two species from each other. The following table gives the result of both analyses and a comparison of the two minerals, together with the differences:—

Chromite.	Trautwinite.	Difference.
S. G. = 4.1647	3.505	
Si = 12.12 per cent.	21.78 per cent.	+ 9.66
Cr = 52.12 "	38.39 "	— 13.73
Fe = 15.24 "	13.29 "	— 1.95
Al = 2.18 "	0.81 "	— 1.37
Ca = 5.65 "	18.58 "	+ 12.93
Mg = 12.29 "	7.88 "	— 4.41

The formation of Trautwinite from chromite may be conceived to have taken place in accordance with the neptunian hypothesis, by the combination of silica and lime with the chromite, thus pro-

ducing the new compound; since both the oxides dissolve in water. When under these circumstances none of the constituents of the older mineral separates, it is self-evident that they will all present themselves in less quantity in the newly formed combination than in that from which it was derived. If a silicate of lime had simply been mixed with the Trautwinite, hydrochloric acid would have affected it. But the acids have no action upon it; hence it is very probable that the silica and lime combined with the chromite form the mineral which we call Trautwinite.

The death of Theodore F. Moss was announced.

OCTOBER 21.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-nine members present.

Stibiaferrite, a new Mineral from Santa Clara County, California. By E. GOLDSMITH.—The mineral occurs on Stibnite, and enters the rock on both sides. The Stibnite between the two layers of the new mineral is $1\frac{1}{2}$ inch thick; and this appears to be the thickness of the vein at the spot whence the specimen was taken. The layers of the *Stibiaferrite* vary in thickness from a thin coating to about a quarter of an inch.

The most of it is amorphous. On examining a number of specimens, I observed some small cavities containing, I believe, the same substance in crystals. The crystals, when observed under a power of a $\frac{3}{4}$ lens, have the habitus of ortho-rhombic prisms. They are generally attached by one end, but a few extend to the other side of the cavity. The termination is the basal plane; I could not find a crystal having a finite pyramid; the infinite pyramids were those of the first and second order. The measurement of one of the crystals, which had a favorable position for observation, was performed with a goniometer (Leeson's) belonging to Mr. Clarence S. Bement. Although I made several efforts to get the exact angles of the crystals, yet I wish it to be understood that the values obtained are only approximate.

The following are the indices or symbols of the observed forms according to the three authors:—

Miller	100,	010,	001,	110.
Naumann . . .	$\infty\bar{P}\infty$,	$\infty\bar{P}\infty$,	OP,	∞P.
Dana	ii,	ii,	O,	I.

The following angles represent normals:—

100,001	90° 0′.
100,010	90° 0′.
001,010	90° 0′.
110,110″	100° 8′.
110,110′	79° 52′.
110,010	39° 56′.
110,001	50° 4′.

The fracture is uneven conchoidal. Opaque in the amorphous, subtranslucent when crystallized.

The lustre is slightly resinous.

The color of the crystallized mineral is faint yellow.

The amorphous is more yellow, and, on some parts, it is even brownish-yellow.

The streak is dull yellow. The powder of the mineral in a thick layer on a white surface is straw-yellow.

The cohesion is not strong; it yields easily to the point of the knife, producing angular pieces, brittle.

The hardness is equal to fluorite, or 4.

Specific gravity = 3.598.

The mineral has no effect on the magnetic needle.

Pyrochemical test: In the glass tube closed on one end it affords water and a white sublimate. On charcoal, metallic globules and a white incrustation, which deposited far from the test, and on stopping the fire, rising fumes. Borax affords, in the oxidizing and in the reducing flames, beads, which are yellow while hot and colorless after cooling.

In nitric acid the substance is not soluble. Hydrochloric acid dissolves it, except quartz, which is an impurity.

Caustic potassa decomposes the mineral, changing the yellow powder apparently into red. The liquor, however, then contained antimoniate of potassa, which, when poured into a mixture of iodide of potassium and hydrochloric acid, liberated iodine. The red powder I ascertained to be sesquioxide of iron.

The quantity of the water I determined by the loss on heating the substance to a low red heat.

For the quantitative determination of the antimonic acid I fused the substance with carbonate of soda and sulphur; extracted the black mass with water, washed, precipitated the sulphuretted antimony with hydrochloric acid, and, after drying and weighing the mixture of sulphuret of antimony and sulphur, I analyzed an aliquot part of it, according to Bunsen's process. (It appears that the adopted process chosen for the determination of the antimony is one of the best known; yet the loss is always greater than it ought to be for close work. It would be a good gift if anybody could present us with a process for the determination of antimony in which the weighing of the sulphuret of antimony and sulphur on a dried paper filter could be avoided.) The iron and the quartz were determined in the usual way.

The result of the analysis was—

Sb	42.96	per cent.
Fe	31.85	"
H	15.26	"
Quartz	8.84	"
Loss	1.09	"
	100.00	

After deducting the quartz and calculating the remainder to percentage, I obtain for the pure substance:—

$\dot{S}b$	47.69 per cent.	Oxygen	11.77
$\dot{F}e$	35.36 "	"	10.60
$\dot{H}$	16.94 "	"	15.05

The equivalent oxygen ratio of $\dot{S}b : \dot{F}e : \dot{H}$ is as 1.1 : 1 : 1.4, or nearly as 1 : 1 : $1\frac{1}{2}$, for which I propose the formula $2(\dot{S}b + \dot{F}e) + 3\dot{H}$.

The mineral described is therefore a hydrous antimoniate of iron.

In regard to the Stibnite, from which the *Stibiaferrite* was probably derived, I have to state a few facts. I made an analysis of it in order to ascertain whether it contained any antimonic acid, or a large amount of iron in any form, but both questions were answered in the negative. The principal difference in the composition of the Stibnite is the large amount of silica with which it is intimately mixed, besides a little arsenic and lead, probably present as sulphurets. The quantitative determination of the latter two I omitted. In all, I ascertained that the antimony was fully saturated with sulphur to form the tersulphuret of antimony. (Sb). The following is the result of my analysis:—

Sb	41.21 per cent.
S	14.85 "
$\dot{F}e$	.02 "
$\dot{S}i$	43.34 "
	99.42 "

I have also a specimen of the rock in which the vein of the Stibnite occurs, and into which the *Stibiaferrite* ramifies. The purest part is white, some is grayish and yellow, caused by the *Stibiaferrite*. The fracture is rough, uneven, on some parts angular. I observed cracks in all directions, but, when closely examined with the lens, I noticed that they are filled with the *Stibiaferrite*.

The rock is perfectly dull, and so is the streak.

The hardness varies between 3 and 5.

The specific gravity I found to be = 2.7529.

Pyrochemical test: On charcoal alone no change. With carb. soda, evolution of carbonic acid gas takes place; and the substance dissolves in the soda, forming a dirty green glass.

In the glass tube closed on one end it affords water and darkness.

Hydrochloric acid has but little effect on it; the acid solution contained but a small amount of Sb and Fe. Hydrofluoric acid dissolves it readily on warming, leaving but a little residue after evaporating the liquor. Caustic potassa dissolves it nearly all. the residue left was very little. The qualitative analysis of a very white piece of this rock furnished the result that the principal substance is amorphous silica, mixed with a little of the oxides of antimony, lead, and iron.

A quantitative Bausch analysis of this rock I did not undertake, because every specimen has probably a different composition, due to the unequal distribution of the *Stibiaferrite.*

As I have not seen the rock *in situ*, I cannot say whether there occurs more antimony in the form of *Stibiaferrite* or as Stibnite; at any rate, it is worth while for the managers of the mine to make this inquiry and let us know.

The Stibnite had on one spot a cavity containing about four crystals of very small size. Viewed under the microscope one white crystal had the form of Valentinite, as figure 179 in Dana's Desc. Min., which crystal was attached to a crystal of Stibnite, showing the gradual change of the latter into the former. Another crystal appeared to be a perfect cube, which may be Senarmontite.

I first saw the specimens in the collection of John C. Trautwine, C. E. This gentleman called my attention to the peculiar yellow mineral on the Stibnite, which he presumed to be new; the presumption is correct so far as my investigation goes, and I herewith return thanks for the specimens received.

OCTOBER 28.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-two members present.

The following paper was presented for publication: "Descriptions of Mexican Ichneumonidæ." By C. T. Cresson.

The following gentlemen were elected members: Jos. C. Wright and Dr. G. T. Barker.

Charles V. Riley, of St. Louis, Mo., was elected a Correspondent.

NOVEMBER 4.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-five members present.

NOVEMBER 11.

The President, Dr. RUSCHENBERGER, in the chair.

Nineteen members present.

Mr. THOMAS MEEHAN desired to correct an error made in his remarks on the Exceptional Conditions of Forest-seed Germination, to which Mr. Sereno Watson had kindly called his attention.

Mr. Watson was said to have named the Rocky Mountain oak *Quercus polymorpha*. Mr. W. had simply adopted the earliest name for it, *Q. undulata* Torr.; also the reference of *Pinus contorta* to *P. Balfouriana* was wrong. It should be *P. aristata*, which name now gives place to the prior *P. Balfouriana*.

NOVEMBER 18.

Mr. VAUX, Vice-President, in the chair.

Thirty-two members present.

The following papers were presented for publication:—

"On the Homologies and Origin of the Types of Molar Teeth in Mammalia Educabilia." By E. D. Cope. "Contribution to the Ichthyology of Alaska." By E. D. Cope.

Prof. COPE remarked that he had observed in the Rocky Mountain region circles of stones arranged by human hands, in countries not now inhabited by the Indians. One of these is in South-western Wyoming near South Bitter Creek, inside the horseshoe of the Mammoth Buttes. The locality is a very barren one, being a sage-brush plain of alkaline debris from the bad lands of the Bridger Formation. It is nine miles from the nearest spring, which is of indifferent quality, and being in a region where game is very scarce, could hardly be regarded as a camping-ground. The circle consists of three uninterrupted concentric rings close together, the hole having a diameter of about fifteen feet. The stones are of moderate size, composed of a dark silex, and evidently derived from the drift material brought down from the Uinta Mountains, which is found on the summits of the bad-land mesas. Five or six miles from this place was found a flint factory with numerous implements and cores.

Two other circles were observed, in Colorado, about one hundred miles east of Long's Peak, and about five miles from a spring in a well grassed country. They are probably similar in character to those described by Mr. Berthoud in the Proceedings of the Academy (1872–46), as having been seen by him on Crow Creek, Col. The circles are formed of a single row of stones each, are situated close together, and are partially overgrown with grass. They lie in low ground behind a line of flat-topped bluffs, and immediately opposite to a narrow gap or opening between two of them. No implements were found, and he could form no opinion as to their age. The locality is unsuitable for a camp, in consequence of the remoteness of wood and water. The country is not inhabited by Indians, the nearest, a temporary camp, for travelling Cheyennes, Sioux, etc., being forty miles distant.

PROF. COPE explained the scope of the paper read by him as follows: The types of molar teeth are considered to be four, viz., the simple conic or truncate (Haplodont); the sides of the crown vertically plicate (Ptychodont); the apex of the crown tuberculate (Bunodont); or plicate (Lophodont). The Bunodonts were regarded as either with opposite or alternate, or few or many tubercles. The Lophodonts were considered in respect to their superior and inferior teeth separately, and are divided into anisognathous, having the maxillary teeth developed more extensively than the mandibular, and isognathous, where the development of the molars in the two jaws is identical. With respect to the structure of the upper molars they are found to represent opposite and alternate tubercles, and are hence divided into Antiodont and Amœbodont series. To the former belong the *Selenodont* (Ruminant), *Tapirodont* (Tapir), and *Trichecodont* (Elephant) types; to the latter, the *Palæotheridont*, *Symborodont*, *Bathmodont*, and *Loxolophodont* types. The mandibular teeth are in like manner either antiodont or amœbodont. Of the former kind are *Selenodonts*, *Hyracodonts* (Rhinoceros), and *Trichecodonts* (Tapir, Elephant, Manatee, etc.); of the latter, *Symborodont* (Anchitherinn, Palæotherium, Palæosyops), *Hippodonts* (Equus), and *Loxolophodont* (*Bathmodon*, *Eobasileus*) types belong. The *Ruminantia* are biserial in the essential constitution of the crests of the upper molars; the Proboscidians (including *Bathmodon* and *Eobasilens*) uniserial, that is, both series of tubercles uniting to form a simple pattern, while the Perissodactyles are intermediate in this respect, with the exception of the true horse, which is Selenodont above.

The genetic relations of the Lophodont teeth are believed to be to corresponding types of the Bunodonts, and connecting series from the typical forms of the latter to corresponding genera of the former are shown to exist in most cases, rendering the probability of descent very strong. It results that Bunodonts and Lophodonts form "homologous groups," and are therefore related genetically, as had been pointed out by the writer some years ago. The mandibular dental characters of the Eocene genera *Achænodon* and *Hyopsodus* are shown to conform to the antiodont and amœbodont types of the bunodont pattern respectively.

The types of extremital structure have nearly similar relations, but are much further reaching in application, each of the divisions *Artiodactyla*, *Proboscidia*, and *Perissodactyla* embracing both Bunodonts and Lophodonts. The probable or theoretical ancestral types of *Bathmodon* and *Eobasileus* are suggested, as well as that of the whole of the *Mammalia—Educabilia*, or *Gyrencephala*, including man. This is necessarily a pentadactyle plantigrade bunodont, probably isognathous, and with cerebral convolutions much reduced.

NOVEMBER 25.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-nine members present.

The following paper was presented for publication:—

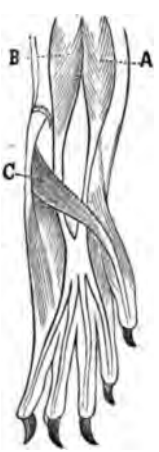
"Description of seven new species of Unionidæ of the United States." By Isaac Lea.

The Committees to which were referred the following papers: "On the Homologies and Origin of the types of Molar Teeth in Mammalia Educabilia," by Edward D. Cope, and "Contributions to the Ichthyology of Alaska," by Edward D. Cope, reported in favor of their publication in the Journal.

The death of Frank Guckert, Correspondent of the Academy, was announced.

Disposition of the Flexor perforans, Flexor longus hallucis, and Flexor accessorius in Paradoxurus musanga Gray.—Dr. H. C. CHAPMAN made the following remarks:—

I have pleasure in calling the attention of the members of the Academy to the arrangement of the Flexor longus hallucis and Flexor accessorius in the Musanga. For the opportunity of dissecting the animal I am indebted to the Directors of the Zoological Garden. Usually in pentadactyle animals there is found a muscle, the Flexor longus hallucis, which, rising from the fibula, passes down to the sole of the foot, and after giving a slip to the Flexor perforans is inserted into the hallux. In man and some other animals, there also exists a muscle, the Flexor accessorius, which, rising from the calcaneum, is inserted into the conjoined tendon of the Flexor perforans and Flexor longus hallucis. The names of these muscles indicate their function. In the Musanga, however, the muscle *B*, which is homologous with the Flexor longus hallucis of man, etc., simply fuses with the tendon of the Flexor perforans, *A*, while the Flexor accessorius, *C*, after giving off muscular slips to the Flexor brevis digitorum, terminates in a tendon which is inserted into the hallux. The Flexor accessorius acts, therefore,



the part of the Flexor longus hallucis, while the latter muscle is functionally only a part of the Flexor perforans. The Flexor accessorius also draws the hallux towards the foot. The F. accessorius, *C*, in the figure is slightly drawn up.

Dr. T. R. Wolf was elected a member, and Prof. S. E. Planchon, of Montpellier, France, was elected a correspondent.

On report of the Committee, the following paper was ordered to be published.

DESCRIPTIONS OF MEXICAN ICHNEUMONIDÆ.

BY E. T. CRESSON.

(Continued from page 176.)

Genus OPHION, Fabr.

1. Ophion mexicanus, n. sp.

♀.—Large; luteous yellow, shining, clothed with a very short pale pubescence; head pale, mandibles and palpi tinged with fulvous, tips of mandibles dusky; eyes large, pale; ocelli very prominent, whitish; antennæ as long as body, dark fuscous; thorax opaque; mesothorax flattened, with three subobsolete longitudinal fulvous stripes; scutellum yellow; metathorax obliquely flattened posteriorly with coarse arcuated and oblique striæ, and a transverse sinuate carina near base; tegulæ pale; wings hyaline, nervures fulvous, inner radial wing nerve incrassate towards the stigma and recurved, membranaceous spots in first submarginal cell hyaline, consisting of a cuneiform spot and beneath it a narrow curved line, broadly dilated towards apex of wing; legs slender, femora darker in color than the remainder; abdomen tinged with brown, first segment slender, slightly and gradually dilated at apex. Length 1 inch.

Cordova. (Sumichrast, No. 94.)

2. Ophion thoracicus.

Ophion thoracicus, Cress., Proc. Ent. Soc. Phila., iv. p. 55.

Cordova.

3. Ophion flavus.

Ophion flavus, Fabr. Ent. Syst., ii. p. 179.

Cordova. (Sumichrast, No. 127.) In two specimens the apex of abdomen is brown.

4. Ophion atriventris, n. sp.

♀.—Large, robust, black; eyes very large, occupying the entire side of the head, the ocelli very large and prominent; head, scape of antennæ, thorax, tegulæ, four anterior legs, and posterior coxæ and trochanters, honey-yellow; spot covering ocelli, tips of anterior tarsi and whole of middle pair blackish; mesothorax smooth, trilobate; scutellum subconvex; metathorax somewhat rounded behind, very coarsely reticulated; wings hyaline, the costa, inter-

rupted by the first marginal cell which is clearly hyaline, broadly dark fuliginous; inner radial nerve nearly straight, very slightly curved near costa, first submarginal cell without membranaceous spots; abdomen robust, entirely black, with a bluish reflection, first segment broadly and rather suddenly dilated at apex. Length 16 lines.

Orizaba. (Sumichrast, No. 64.) A very robust and distinct species.

Genus NOTOTRACHYS, Marshall.

Nototrachys fuscatus.

Trachynotus fuscatus, Cress., Proc. Ent. Soc. Phil., iv. p. 50.

Orizaba, Cordova. (Sumichrast, No. 138.)

Genus EXOCHILUM, Wesm.

Exochilum mundum.

Ophion mundus, Say, Bost. Journ. Nat. Hist., i. p. 228.

Cordova.

Genus THYREODON, Brullé.

1. **Thyreodon niger**, n. sp.

♂ ♀.—Entirely black, shining, more slender in form than *morio*, Fabr.; antennæ of ♀ entirely black, that of ♂ more or less yellowish beneath; impressed lines of mesothorax longitudinally roughened; pleura polished; metathorax opaque, closely reticulated, clothed with very short, dense black pubescence, posterior face broad and flat, the flanks protuberant; scutellum deeply excavated at base; wings black, with a brassy gloss; legs shining, tibiæ, tarsi, and abdomen with brownish sericeous pile; first segment of abdomen slender, slightly dilated at apex, second segment with a broad shallow groove on each side. Length 13½ lines.

Cordova. (Sumichrast, No. 65.) Much like *morio* Fabr., but more slender, and distinguished at once by the black antennæ.

2. **Thyreodon maculipennis**, n. sp.

♂ ♀.—Entirely black, shining, with a more or less distinct bluish reflection; antennæ ————; wings violaceous black, the anterior pair with a large subquadrate hyaline spot, covering most of the first submarginal and first discoidal cells; metathorax

deeply sulcate behind, and obliquely striated; impressed lines of mesothorax not roughened; otherwise the form and sculpture are similar to *niger*. Length 12 lines.

Cordova; Orizaba. Easily recognized by the black violaceous anterior wings having each a large hyaline median spot.

3. **Thyreodon laticinctus, n. sp.**

♀.—Black, form and sculpture as in *niger*; wings black, with a very strong brassy gloss; abdomen polished, the third and basal half of fourth segments lemon-yellow. Length one inch.

Orizaba. A very conspicuous species.

4. **Thyreodon ornatipennis, n. sp.**

♀.—Brownish-ferruginous, metathorax darker; eyes ovate, not unusually large, ocelli small; antennæ fulvous, dark at base; thorax very densely and finely sculptured; middle of mesothorax longitudinally furrowed; scutellum deeply excavated at base, with lateral carina very prominent; metathorax flattened on its posterior face, the apex deeply excavated; wings dark fuliginous, the middle of both pairs with a large yellow mark; legs and abdomen light-brown, tips of tarsi and base of second abdominal segment black, sides of segments 2, 3, 4, 5, stained with fuscous. Length 17½ lines.

Orizaba. (Sumichrast, No. 63.)

Genus ANOMALON, Jur.

1. **Anomalon mexicanum, n. sp.**

♀.—Large; lemon-yellow; head buccate; extreme tips of mandibles, spot on vertex, antennæ, three stripes on mesothorax, large mark on pleura continued beneath, and two spots on lateral basal margin of metathorax, black; antennæ about three-fourths the length of body; mesothorax coarsely rugose; metathorax coarsely reticulated; scutellum depressed medially; wings dusky-hyaline, fuscous at tips; first submarginal cell receiving recurrent nervure a little beyond the middle, discoidal cell short, not more than half the length of first submarginal, contracted to a point at tip; four anterior legs entirely lemon-yellow, posterior femora and tibiæ ferruginous, their coxæ, except tips, trochanters, base of femora and tarsi, black, tips of coxæ yellow; abdomen ferruginous, the first and dorsal edge of second segment black. Length 10½ lines.

Orizaba. (Sumichrast, No. 68.)

2. Anomalon vitticolle, n. sp.

♀.—Lemon-yellow; extreme tips of mandibles, a large triangular spot on vertex extending from insertion of antennæ to posterior margin of vertex and across to summit of eyes, antennæ except basal joint, three broad stripes on mesothorax, oblique line on pleura, triangular mark on scutellum, and three stripes on metathorax connected by line on basal margin, black; antennæ as long as the body; scutellum broadly concave; metathorax coarsely reticulated; wings hyaline, iridescent, extreme tips fuscous; second submarginal cell receiving recurrent nervure at about the middle, discoidal cell contracted at base; four anterior legs lemon-yellow, their femora tinged with honey-yellow; posterior legs ferruginous, their coxæ honey-yellow, a broad stripe on their outer side, trochanters, base of the femora and of the tibiæ, and their tarsi, entirely black; abdomen ferruginous, very slender, dorsal edge of second segment black; ovipositor as long as first segment. Length 6 lines.

Orizaba. (Sumichrast, No. 42.)

3. Anomalon magum, n. sp.

♂ ♀.—Honey-yellow; face, mouth, cheeks, anterior orbits, and scape lemon-yellow; tips of mandibles and spot on vertex black; head buccate; antennæ about as long as body, dusky above and at tips beneath; scutellums, and sometimes the margins of pleura and sides and apex of metathorax, yellow, the latter coarsely reticulated; wings tinged with yellowish-fuscous, nervures ferruginous; discoidal cell long, contracted at base; legs lemon-yellow, posterior pair honey-yellow, their trochanters above and tips of their tibiæ blackish, their tarsi yellow; abdomen much compressed beyond second segment, the dorsal edge of these segments more or less dusky; ovipositor very short. Length 7 lines.

♂.—Darker in color; black spot on vertex very large and continued to occiput; thorax, excepting metathorax, generally much varied with black; dorsal edge of second and remaining segments blackish. Length 7 lines.

Cordova.

4. Anomalon peritum, n. sp.

♀.—Yellow; head buccate; extreme tip of mandibles and spot within ocelli black; antennæ scarcely half the length of body, black, basal joint yellow; thorax punctured, mesothorax less

strongly so, a black spot on anterior middle; metathorax coarsely reticulated; wings slightly tinged with yellowish, first submarginal cell receiving recurrent nervure a little before the middle, discoidal cell contracted at base; four anterior legs honey-yellow, coxæ and trochanters lemon-yellow; posterior legs ferruginous, trochanters, base of femora, and tibiæ, except base, black, coxæ tinged with yellowish at base; abdomen ferruginous, much compressed beyond second segment, apex of first and dorsal edge of second segments black; ovipositor very short. Length 7 lines.

Mirador.

5. **Anomalon residuum**, n. sp.

♀.—Head strongly buccate, shining, lemon-yellow, tips of mandibles, and a large spot on vertex covering ocelli and extending to posterior margin of occiput black, margined with honey-yellow at summit of eyes; antennæ as long as body, brown, pale beneath, three basal joints above and apical joints more or less blackish; thorax ferruginous; mesothorax shining, prominent anteriorly, with a black stripe attenuated posteriorly; scutellum and spot on postscutellum yellow; lower margin of prothorax and spot on posterior margin of pleura yellow; metathorax with large reticulations, sides and apex tinged with yellow; wings hyaline, first submarginal cell receiving recurrent nervure before the middle, discoidal cell long, much contracted at base; four anterior legs lemon-yellow, their femora honey-yellow; posterior legs ferruginous, trochanters black, tibiæ and tarsi dusky; abdomen honey-yellow, much compressed beyond second segment, dorsal edge of second and following segments blackish; venter yellow; ovipositor very short. Length 6 lines.

Orizaba. (Sumichrast, No. 155.)

6. **Anomalon scelerosum**, n. sp.

♂ ♀.—Honey-yellow or pale ferruginous, clothed with a short fine whitish pubescence; face, orbits, mouth, and cheeks lemon-yellow, large spot inclosing ocelli black; tips of mandibles black; head buccate; antennæ three-fourths as long as body, honey-yellow, tips dusky, scape beneath yellowish; metathorax coarsely reticulated; wings hyaline, iridescent, faintly tinged with dusky; first submarginal cell receiving the recurrent nervure a little before the middle, discoidal cell long, much contracted at base; legs honey-yellow, four anterior tibiæ and tarsi and posterior tarsi

except base lemon-yellow; abdomen very slender, much compressed beyond second segment, dorsal edge of second and third segments and the two apical segments entirely black; ovipositor very short. Length 6 lines.

Orizaba. (Sumichrast, No. 154.)

7. **Anomalon fumipenne**, n. sp.

♀.—Dull ferruginous, rather thickly clothed with a short dull yellowish pubescence; head buccate; face and cheeks yellow; antennæ ————————; metathorax coarsely reticulated; wings dark fuscous; first submarginal cell receiving the recurrent nervure a little before the middle, discoidal cell contracted at base; four anterior legs yellow, tinged with ferruginous at base; posterior legs ferruginous, trochanters and apical half of tibiæ black, their tarsi shorter than the tibiæ, yellow; abdomen strongly compressed beyond second segment, the dorsal edge of which is black; ovipositor very short. Length 7 lines.

Orizaba. (Sumichrast, No. 69.) The legs are shorter and stouter than is usual in this genus.

8. **Anomalon agnatum**, n. sp.

♂.—Yellow; head strongly buccate, a large black spot behind antennæ, inclosing ocelli; antennæ more than half the length of body, honey-yellow, basal joint yellow, second and third and apical joints black; mesothorax honey-yellow with an elongate black spot on each lobe, the depressions crenulated; metathorax coarsely reticulated; wings uniformly pale yellowish-hyaline; first submarginal cell receiving the recurrent nervure a little before the middle, discoidal cell long, contracted at base; legs honey-yellow, tips of intermediate femora and the posterior trochanters, femora and tips of tibiæ honey-yellow; abdomen yellow or pale honey-yellow, dorsal edge of second and the two apical segments black, third and following segments strongly compressed. Length 8 lines.

Mirador.

9. **Anomalon? elegans**, n. sp.

♀.—Shining, pale lemon-yellow; tips of mandibles, spot behind insertion of antennæ, vertex, and occiput black; antennæ black at tip, becoming paler to base which is yellow; mesothorax sparsely and strongly punctured, posterior half black; metathorax smooth with a narrow black band across the disk, sometimes interrupted

into spots; wings hyaline, iridescent, beautifully tipped with black; four anterior legs lemon-yellow, intermediate tarsi dusky; posterior legs honey-yellow, their coxæ lemon-yellow, with a slender black stripe on outer side, tips of their tibiæ and their tarsi black; abdomen dark honey-yellow, lateral margins of second and third segments and sometimes the disk of first black; ovipositor nearly as long as abdomen, honey-yellow, sheaths pale yellow; head transverse, face with a prominent tubercle, eyes prominent; antennæ long and slender; mesothorax not prominent; first submarginal cell receiving the recurrent nervure about the middle, discoidal cell short, much contracted at base; abdomen only slightly compressed at tip, the first three segments being depressed. Length 6 lines.

Orizaba. (Sumichrast, No. 40.) A beautiful species, differing from *Anomalon* chiefly by the abdomen not being compressed.

Genus OPHIOPTERUS, Brullé.

Ophiopterus ferrugineus, n. sp.

♀.—Ferruginous; head coarsely punctured, clothed with a very short silvery pile, sides of face and posterior orbits yellow; antennæ as long as body, very slender, black, basal half pale ferruginous, a rather broad yellowish-white annulus between middle and apex; mesothorax rugoso-punctate; pleura sparsely punctate; metathorax reticulated, the apex suddenly attenuated and prolonged to insertion of abdomen; sides of pleura and metathorax clothed with a fine white pubescence; wings hyaline, faintly dusky at tips, neuration as usual in *Anomalon*, the discoidal cell about one-third contracted at base; legs pale ferruginous, four anterior tibiæ and tarsi more or less yellowish, posterior tarsi black, with the second and part of joints yellow; abdomen slender, compressed dorsal edge of second segment blackish; ovipositor very short, sheaths black. Length 8 lines.

Orizaba. (Sumichrast, No. 47.)

Genus EIPHOSOMA, Cresson.

1. Eiphosoma mexicana, n. sp.

♀.—Lemon-yellow; tips of mandibles, large spot on vertex inclosing ocelli and extending on and covering nearly the entire

occiput, antennæ except scape beneath, three broad stripes on mesothorax, oblique stripe on pleura, basal margin of metathorax, and a stripe down the median sulcus not quite reaching the apex, spot on outer side of posterior coxæ, basal trochanter, base of their femora dilated within, base and apex of their tibiæ and their tarsi, spot on tip of first abdominal segment, and dorsal edge of remaining segments, broad on second and gradually narrower to apex, all black; mesothorax strongly and sparsely punctured; metathorax sparsely punctured, median sulcus deep and smooth; wings hyaline, nervures and stigma black, apical trochanter of posterior legs white, their femora ferruginous, white at extreme apex, tooth small and acute, their tibiæ with a broadish yellow annulus; abdomen honey-yellow, basal half of first segment pale yellow. Length 9½–10 lines.

Cordova. (Sumichrast, Nos. 67, 70, 149.) This is larger than *vitticollis*, which it resembles by the wings being clear at tips; the body is more robust and the posterior femora differently colored.

2. **Eiphosoma vitticollis.**

Eiphosoma vitticollis, Cress., Proc. Ent. Soc. Phil., iv. p. 53.

Orizaba; Cordova. (Sumichrast, Nos. 43, 114.)

3. **Eiphosoma azteca, n. sp.**

♀.—Lemon-yellow; extreme tips of mandibles, large spot on vertex covering ocelli and occiput, antennæ except scape beneath, three stripes on mesothorax, oblique line on pleura, sometimes slightly interrupted, basal suture of metathorax, stripe down the median sulcus, a spot on the flanks, and sometimes the tip of scutellum, black; sometimes the lateral stripes on mesothorax are ferruginous shading into black or brown anteriorly; mesothorax with large sparse punctures; sulcus of metathorax broad and rather deep; wings hyaline, iridescent, tipped with pale fuliginous; four anterior legs lemon-yellow, their femora and posterior coxæ more or less honey-yellow; posterior femora ferruginous, base of their trochanters, their tibiæ, except an ill-defined yellowish annulus on middle, and their tarsi black; apex of trochanters yellow, sometimes their coxæ within and base and apex of femora within are black; femoral tooth short; abdomen honey-yellow or pale ferruginous, dorsal edge of second and remaining segments black, broad on second and gradually narrower on the others, basal half of first segment yellowish; ovipositor about half the length of body, sheaths black. Length 7½–9½ lines.

♂.—More slender; stripes on mesothorax very broad and sometimes confluent posteriorly; apex of scutellum and postscutellum generally black; tips of wings darker; legs honey-yellow, posterior femora above, their tibiæ almost entirely and their tarsi black; abdomen very slender, the dorsal edge and generally the two or three apical segments black. Length 6–7½ lines.

Orizaba; Cordova. Generally larger than *nigrovittata* (from Cuba) which it resembles in the ornamentation of the anterior wings, but differs greatly in the color of posterior legs.

Genus PANISCUS, Grav.

Paniscus geminatus.

Ophion geminatus, Say, Macl. Lyc., i. p. 76.

Orizaba; Cordova (Sumichrast, No. 103); Mirador. Very common, varying in size from 4–8½ lines.

Genus CAMPOPLEX, Grav.

1. Campoplex opimus, n. sp.

♀.—Head, antennæ, thorax, coxæ, posterior femora, tips of their tibiæ, their tarsi, and dorsal edge of abdomen, black, clothed with a pale pubescence, most dense on face, sides of scutellum, and on metathorax; mandibles, palpi, scape beneath, tegulæ, four anterior legs, basal two-thirds of posterior tibiæ, and abdomen except dorsal edge, pale yellow; metathorax tinged with yellowish on each side above, sulcate down the middle and transversely striate; wings yellowish-hyaline, dusky at tips, areolet rather small, triangular. Length 8 lines.

Cordova.

2. Campoplex tepanecus, n. sp.

♀.—Rufo-fuscous, more or less varied with blackish; antennæ black, the scape sometimes rufous; face, mesothorax, middle of metathorax, femora, and dorsal edge of second abdominal segment generally black; spot on mandibles, palpi, four anterior tibiæ, anterior tarsi, and line on outside of posterior tibiæ, yellow; wings hyaline or subhyaline, marginal cell and apex more or less dusky, areolet large. Length 7½–8 lines.

♂.—Head, antennæ, thorax, and legs black; abdomen rufo-fuscous, dusky at apex; scape beneath and posterior tibiæ except tips, yellow. Length 5 lines.

Orizaba. (Sumichrast, No. 45.)

3. **Campoplex lacivius**, n. sp.

♂.—Black, clothed with pale pubescence; abdomen brown; spot on mandibles, palpi, scape beneath, tegulæ, anterior coxæ beneath, anterior legs except trochanters and femora above, tips of intermediate femora, their tibiæ and tarsi except tips of joints yellowish-white; wings subhyaline, areolet moderate, subtriangular, petiolated; dorsal edge of second abdominal segment black. Length 5½ lines.

Cordova.

4. **Campoplex aurifer**, n. sp.

♀.—Head, antennæ, thorax, and posterior coxæ, black, clothed with a golden pile, especially dense on face, sides of scutellum, and face of metathorax; mandibles, scape beneath, tegulæ, legs, and most of abdomen, lemon-yellow; wings yellow-hyaline, nervures yellow, areolet large; outer side of posterior femora and tibiæ, and their tarsi dusky; apex of first abdominal segment, dorsal edge of remaining segments, broad on second and very narrow on the others, blackish, sides of abdomen tinged with dusky. Length 8½ lines.

♂.—Differs by the first abdominal segment being fuscous and remaining segments more varied with dusky; the golden pile on metathorax is more dense and brighter; the antennæ are longer. Length 8 lines.

Orizaba. (Sumichrast, No. 46.)

5. **Campoplex flaviponnis**, n. sp.

♀.—Head, thorax, and posterior coxæ black, clothed with a golden pile, especially dense on face; sides of scutellum and metathorax; mandibles, palpi, scape beneath, tegulæ, legs, and abdomen, lemon-yellow; wings yellow-hyaline, apex faintly dusky, areolet large; antennæ fuscous, much paler at base; posterior femora, dorsal edge of second abdominal segment and narrow apical margins of remaining segments dusky. Length 4–6 lines.

Var. TERMINALIS, ♀.—Three apical segments of abdomen entirely fuscous. Length 5¾ lines.

Orizaba. (Sumichrast, No. 41.)

6. **Campoplex melliventris**, n. sp.

♀.—Head, thorax, and coxæ, black, with a sparse golden pile; antennæ blackish, pale at base, scape yellow beneath; spot on

mandibles, palpi, tegulæ, four anterior legs, and posterior trochanters pale lemon-yellow; posterior legs and abdomen pale honey-yellow; upper edge of second abdominal segment black; wings hyaline, iridescent, tips dusky; areolet moderate, triangular, petiolated. Length 4¾ lines.

Cordova.

7. **Campoplex lectus, n. sp.**

♂.—Head, antennæ, thorax, coxæ, apex of abdomen, and upper edge of second segment, black, with a very fine sparse golden pile; mandibles, scape beneath, tegulæ, four anterior legs, anterior coxæ beneath, and basal segment of abdomen, pale lemon-yellow; posterior legs and remainder of abdomen honey-yellow, the former varied with dusky; wings yellow-hyaline, apex fuscous, areolet large, rhomboidal, petiolated; metathorax finely reticulated. Length 5½ lines.

Orizaba. (Sumichrast, No. 128.)

8. **Campoplex gnarus, n. sp.**

♂.—Head, antennæ, and thorax black, clothed with a pale golden pubescence; mandibles, palpi, scape beneath, tegulæ, four anterior legs pale lemon-yellow; posterior legs and abdomen honey-yellow; base of flagellum pale; posterior tarsi, apex of abdomen, and dorsal edge of second segment blackish; wings hyaline, iridescent, tips fuscous, areolet large, rhomboidal, petiolated. Length 4 lines.

Orizaba. (Sumichrast, No. 157.) Much like *melliventris*, but distinguished at once by the yellow coxæ.

9. **Campoplex calcaratus, n. sp.**

♂ ♀.—Black; spot on mandibles, palpi, tegulæ, anterior legs except coxæ, tips of intermediate femora, their tibiæ and tarsi, extreme base of posterior tibiæ and all the tibial spurs, pale lemon-yellow; abdomen rufous, the first, most of second, and dorsal edge of remaining segments black; face, metathorax, and legs clothed with a fine silvery pile; wings hyaline, iridescent, areolet large. Length 5½ lines.

Orizaba. (Sumichrast, No. 80.)

10. **Campoplex macilentus, n. sp.**

♀.—Black, clothed with a sparse silvery pubescence; third and following segments of abdomen, except broad dorsal edge, honey-

yellow; mandibles, palpi, scape beneath, four anterior legs, apex of posterior coxæ and their trochanters and tibial spurs, pale yellow; wings hyaline, iridescent, apical margin faintly dusky, areolet minute, petiolated; head broader than usual, subbuccate; metathorax with elevated lines. Length 5 lines.

Cordova.

11. Campoplex divisus, n. sp.

♂.—Head, four posterior coxæ, and first abdominal segment, except apex, black, clothed with a sparse pale golden pubescence; posterior legs and abdomen honey-yellow; mandibles, palpi, scape, tegulæ, anterior coxæ, and four anterior legs pale yellow; posterior tibiæ and tarsi dusky; base of second and third segments of abdomen black; wings hyaline, dusky at tips, areolet minute, petiolated. Length 4 lines.

Orizaba. (Sumichrast, No. 133.)

12. Campoplex maceratus, n. sp.

♂.—Head, antennæ, thorax, four posterior coxæ, and posterior tibiæ and tarsi black; face, scutellum, and metathorax clothed with a very dense golden pubescence; mandibles, palpi, scape, tegulæ, four anterior legs, except intermediate coxæ above, and posterior trochanters, pale lemon-yellow; posterior femora and abdomen brown; first abdominal segment near apex, and second segment above black; wings hyaline, tips dusky, areolet minute, petiolated. Length 6 lines.

Cordova.

13. Campoplex nefastus, n. sp.

♂.—Black; mandibles, palpi, scape beneath, anterior legs and tibiæ, except base and apex of posterior pair, yellow; wings yellowish-hyaline, nervures black, areolet minute, petiolated, opaque; abdomen shining, clavate, compressed; metathorax with well-defined elevated lines. Length 5 lines.

Cordova.

14. Campoplex legalis, n. sp.

♂.—Head, antennæ, thorax, and coxæ black, clothed with a golden pubescence, most dense on face, sides of scutellum, and metathorax; mandibles, palpi, scape, tegulæ, and four anterior legs pale yellow; tips of four anterior tarsi, posterior legs, except trochanters, upper and lower edge of femora, and outer edge of

tibiæ, blackish; abdomen yellowish-brown, first segment, except apex, and dorsal edge of remaining segments black; wings hyaline, tips dusky, areolet minute, petiolated. Length 5½ lines.

Mirador.

15 Campoplex inæqualipes, n. sp.

♀.—Black, clothed with a pale pubescence; posterior legs and abdomen, except base above, reddish-brown; mandibles, palpi, four anterior legs, except coxæ, and posterior tibiæ, except first and last joints, pale yellow; wings yellowish-hyaline, faintly dusky at tips, areolet minute, petiolated; metathorax broadly excavated behind, the lateral angles prominent; posterior legs long, robust, tibiæ dilated and flattened at tips, first tarsal joint robust; abdomen short, arcuate, compressed at tip; antennæ longer than body. Length 4 lines.

Orizaba. (Sumichrast, No. 54.)

Genus LIMNERIA, Holmgren.

Limneria ? inæqualis, n. sp.

♂ ♀.—Opaque-black, head and thorax clothed with a fine whitish pubescence; mandibles, palpi, scape beneath, and tegulæ, yellowish-white; metathorax with tolerably well-defined elevated lines forming cells, the central one broad, sexangular; wings hyaline, iridescent, nervures and stigma black, no areolet; all the coxæ black, anterior legs pale yellow, their femora, except tips, their tibiæ within, and tarsal tips more or less fuscous; four posterior legs black, a broad whitish annulus near base of the tibiæ; two spots at base of second abdominal segment, band at base of third, and base of venter yellowish-white, apex of ♀ abdomen broad and compressed. Length 3 lines.

Orizaba; Cordova.

NONNUS, n. gen.

Form long and slender; head transverse, eyes very prominent, face narrow, wider above, sides depressed, clypeus convex, mandibles rather large, ocelli tolerably prominent, cheeks small; antennæ long and very slender, basal joint short and globose; thorax gibbous; mesothorax sometimes with depressed longitudinal lines; scutellum gibbous, convex; metathorax elongate, longer than mesothorax and scutellum together, generally smooth, apex not pro-

duced, spiracles linear; pleura large, convex beneath; wings narrow, marginal cell long, lanceolate, pointed at apex, first submarginal cell receiving recurrent nervure before the middle, areolet longitudinally subquadrate, nearly twice longer than broad, receiving the second recurrent nervure, which is oblique, at the middle, stigma very narrow; legs very long and slender, anterior tibiæ very short, incrassate, attenuated at base and depressed at tip, their tarsi double the length of the tibiæ and very slender, intermediate tarsi longer than their tibiæ, while the posterior tibiæ and tarsi are about equal in length, their coxæ elongate; claws minute and pectinated; abdomen nearly twice longer than thorax, only slightly compressed towards apex, first segment sublinear, thickened towards apex, second segment a little longer than the first, depressed, slightly widened towards apex, third segment about half the length of second, the remaining segments very gradually shorter; ovipositor two-thirds the length of the abdomen.

1. **Nonnus atratus**, n. sp.

♀.—Body entirely black; the two or three basal joints of flagellum above, and a tolerably broad annulus about the middle, white; disk of metathorax transversely striated; wings brassy-hyaline, nervures black; anterior legs, the intermediate tibiæ and tarsi in front and base of posterior tibiæ more or less luteous, second and third joints of posterior tarsi white; sheaths of ovipositor broadly tipped with white. Length 6–8 lines.

Cordova. (Sumichrast, No. 116.)

2. **Nonnus antennatus**, n. sp.

♀.—Ferruginous; thorax clothed with a very fine silvery sericeous pile; head and antennæ black, the second, third, fourth, and a part of the fifth joints of the latter above, and a broad annulus a little beyond the middle white; palpi, except basal joint, also white; mandibles with a testaceous spot; mesothorax perfectly smooth, sometimes with a broad central black stripe; metathorax finely rugulose on disk; wings brassy-hyaline, nervures black; legs pale ferruginous, paler to tips, posterior tarsi blackish, with second and third joints white; abdomen black beyond second segment, apex with two small white spots; ovipositor broadly tipped with white. Length 5½–7 lines.

♂.—More slender; base of antennæ honey-yellow; four anterior tibiæ yellow; two apical joints of anterior tarsi and the inter-

mediate pair, except base, blackish, tips of posterior tibiæ blackish, apical half of first joint of their tarsi, as well as the second and third joints, white; abdomen gradually darker from tip of second segment to apex. Length 5½ lines.

Orizaba. (Sumichrast, No. 39 ♀, 145 ♂.)

Genus MESOCHORUS, Grav.

Mesochorus totanaceus, n. sp.

♀.—Pale honey-yellow, metathorax and abdomen darker, smooth, and polished; tips of mandibles, antennæ except base, first segment of abdomen, and basal half of second, black; wings hyaline, iridescent, nervures and stigma blackish; tips of posterior femora, of their tibiæ, and of all the tarsi, dusky; head large, transverse, face broad, prominent beneath antennæ, eyes small, ovate, cheeks large, convex; antennæ slender (broken off beyond joint 9); mesothorax convex, slightly protuberant anteriorly; metathorax rounded, convex, with sharply-defined elevated lines, forming areas, the central one elongate, rather large; wings ample, stigma large, areolet large, rhomboidal; legs slender; abdomen flattened at base, compressed at tip; ovipositor short. Length 2¼ lines.

Orizaba.

Genus PRISTOMERUS, Curtis.

Pristomerus mexicanus, n. sp.

♂.—Black, shining; clypeus honey-yellow; mandibles, except tips and palpi, pale yellowish; scape pale ferruginous; sides of mesothorax ferruginous, scutellum paler; tegulæ yellowish; metathorax with well-defined elevated lines, forming several differently shaped cells, the central one elongate, widened near apex; wings hyaline, iridescent, nervures and stigma black; four anterior legs yellow, their coxæ and femora honey-yellow; posterior coxæ black, their tips yellowish, their femora and tibiæ brown or blackish-brown, extreme base and apex of the femora and middle of the tibiæ yellowish, their tarsi fuscous pale at base; posterior trochanters pale at tips, femoral tooth long and stout, between it and the tip several very fine serratures; apical half of first abdominal segment and very narrow apical margin of first and second segments, sometimes obsolete, pale yellowish. Length 3¼ lines.

Mirador.

Genus EXETASTES, Grav.

1. **Exetastes vittatipes**, n. sp.

♀.—Head white, vertex and occiput except orbits, spot beneath antennæ, tips of mandibles, and antennæ black, scape beneath and broad annulus on antennæ white; prothorax black, anterior margin broadly white; mesothorax black, two spots in front and one on the disk, white; base of scutellum, postscutellum, tegulæ, metathorax, and pleura white, apex of scutellum, scutellar region, a large bilobed mark at base of metathorax, the extreme apex, line on anterior lateral suture, spot beneath tegulæ, and two or three small spots on side of pleura, black; wings hyaline, nervures and stigma black; coxæ, trochanters, and posterior tarsi white, remainder luteous-yellow, stripe on outside of coxæ and on trochanters, stripe on all the femora above, outer side of four anterior tibiæ, their tarsi, and tips of posterior tarsi, black, base of the latter yellow; abdomen above black, base of first segment and broad apical margins of all the segments white; venter whitish. Clypeus convex; antennæ as long as body, slender, especially at tips; thorax opaque; metathorax rounded, minutely sculptured; abdomen shining, tips subcompressed, ovipositor short. Length 5½ lines.

Cordova.

2. **Exetastes tarsalis**, n. sp.

♂ ♀.—Differs from *vittatipes* only as follows: The metathorax has two lunate marks at base instead of a bilobed mark; only the extreme apex of scutellum is black; the legs are strongly tinged with honey-yellow, a dot on outside of intermediate coxæ, a stripe on posterior pair, and tips of all the tarsi, black, posterior tibiæ, and tarsi yellow, tips of the former dusky and of the latter black; remainder as in *vittatipes*. Length 4¼ lines.

Cordova.

3. **Exetastes mexicanus**, n. sp.

♂.—Lemon-yellow; spot on vertex, covering ocelli, transverse curved line on occiput, tips of mandibles, antennæ, except scape beneath and annulus on flagellum, two spots on prothorax anteriorly, its upper and lateral margins, three broad lines on mesothorax, the medial one abbreviated behind, the others abbreviated before and confluent behind, triangular mark on base of scutellum,

its apical margin, bilobed mark on base of metathorax, line on lateral anterior suture, a spot at extreme tip above, line on anterior suture of pleura, a spot beneath wing, another low down, another before each middle coxa, spot on outside of four anterior coxæ, line on posterior pair behind, posterior trochanters at base, line on four anterior femora above, posterior pair within, tips of their tibiæ, tips of all the tarsi more or less, band on middle of first abdominal segment, and the remaining segments above, except broad apical margins, black; wings yellow-hyaline, nervures brown, stigma honey-yellow. Antennæ longer than body, slender; scutellum convex; metathorax striated across the middle; abdomen compressed at tip. Length 5½ lines.

Mirador.

Genus MESOLEPTUS, Grav.

1. **Mesoleptus calidus.**

Mesoleptus calidus, Cress., Trans. Am. Ent. Soc., ii. p. 33, ♂.

Cordova.

2. **Mesoleptus asteeus, n. sp.**

♂.—Honey-yellow; face, mouth, orbits, cheeks, broad annulus on antennæ, collar, prothorax, most of pleura, flanks of metathorax, scutellum, tegulæ, four anterior and most of posterior coxæ, white; spot on vertex, tips of mandibles, middle and apex of antennæ, spot behind head, sutural line beneath tegulæ, sutures and impressed lines of mesothorax, sides of scutellum, posterior suture of pleura, slender stripe on each side of metathorax, a spot on apical middle, and a line over posterior coxæ, black; wings hyaline, iridescent, nervures black. Slender; metathorax longitudinally striated, with two transverse carinæ; areolet of anterior wing broad 5-angular; abdomen long, slender, subclavate; antennæ about as long as body. Length 4½ lines.

Orizaba.

3. **Mesoleptus melleus.**

Mesoleptus melleus, Cress., Trans. Am. Ent. Soc., ii. p. 34, ♂.

Cordova.

4. **Mesoleptus bardus.**

Mesoleptus bardus, Cress., Trans. Am. Ent. Soc., ii. p. 34, ♂.

Cordova.

5. **Mesoleptus imbecillis.**
Mesoleptus imbecillis, Cress., Trans. Am. Ent. Soc., ii. p. 34, ♂.
Cordova.

6. **Mesoleptus emaceratus.**
Mesoleptus emaceratus, Cress., Trans. Am. Ent. Soc., ii. p. 35, ♂.
Orizaba.

7. **Mesoleptus decorosus.**
Mesoleptus decorosus, Cress., Trans. Am. Ent. Soc., ii. p. 35, ♂.
Orizaba.

8. **Mesoleptus? bucephalus.**
Mesoleptus? bucephalus, Cress., Trans. Am. Ent. Soc., ii. p. 36, ♂.
Cordova.

9. **Mesoleptus? anguina,** n. sp.

♀.—Head and thorax whitish; large ovate mark above antennæ extending from their base to back of occiput, posterior margin of latter, antennæ (except annulus, and scape beneath, which are white), mesothorax except two central stripes, scutellar region, middle of metathorax, broadly and suddenly dilated at base, a spot on each side anteriorly, spot at base of posterior coxæ, their trochanters above, line on first abdominal segment, base of second and a stripe on each side of this and the following segments, black; legs and abdomen tinged with honey-yellow; coxæ, trochanters, and first abdominal segment whitish; wings hyaline, iridescent, nervures brownish. Smooth and polished; head large, subglobose, cheeks broad, convex; clypeus large, convex, apex truncate; eyes rather small, ovate; antennæ about as long as body, slender, flagellum slightly thickened at tips; scutellum smooth and convex; metathorax rounded above, with a transverse arcuate carina near base and another near apex; wings narrow, areolet incomplete, the outer nervure wanting, stigma small; legs long, slender, simple, claws simple; abdomen long and slender, especially so at base, arched in profile, the two basal segments long, the second the longer, with large oblique gastrocœli; ovipositor short. Length 3½ lines.
Orizaba.

Genus TRYPHON, Grav.

1. **Tryphon mexicanus,** n. sp.

♂.—Black; mandibles, palpi, tegulæ, and four anterior coxæ and trochanters very pale lemon-yellow or yellowish-white; antennæ

fuscous, base yellowish; legs and abdomen except first segment and two spots near base of second honey-yellow; wings subhyaline, faintly fuscous. Shining; head and thorax finely pubescent; head broad; antennæ long, setaceous; metathorax rounded, with well-defined elevated lines crossing each other and forming cells; mesothorax smooth, round, without impressed lines; outer nervure of areolet wanting; legs slender, claws pectinate; abdomen subpetiolate, subclavate, flattened, polished. Length 4 lines.

Mirador.

2. **Tryphon crocciventris.**

Tryphon crocciventris, Cress., Trans. Am. Ent. Soc., ii. p. 36, ♂.

Cordova.

3. **Tryphon? maculipennis, n. sp.**

♂ ♀.—Smooth and shining, ferruginous, broad annulus before apex of antennæ and posterior tarsi except base and apex, pale yellow; wings unusually broad, dark fuscous, with a large subtriangular hyaline spot on anterior pair beginning at apex of stigma, tip of wing paler fuscous; tips of antennæ black, base honey-yellow. Length 3½–4 lines.

Orizaba.

4. **Tryphon? laticinctus.**

Tryphon? laticinctus, Cress., Trans. Am. Ent. Soc., ii. p. 36, ♀.

Cordova.

Genus EXOCHOIDES, Cresson.

1. **Exochoides mexicana.**

Exochoides mexicana, Cress., Trans. Am. Ent. Soc., ii. p. 37, ♂.

Orizaba. (Sumichrast, No. 3.)

2. **Exochoides concinna.**

Exochoides concinna, Cress., Trans. Am. Ent. Soc., ii. p. 37, ♂.

Cordova.

Genus EXOCHUS, Grav.

1. **Exochus cæruliventris.**

Exochus cæruliventris, Cress., Trans. Am. Ent. Soc., ii. p. 38, ♂.

Orizaba. (Sumichrast, No. 52.)

2. **Exochus tricarinatus.**

Exochus tricarinatus, Cress., Trans. Am. Ent. Soc., ii. p. 38, ♂.

Cordova.

3. **Exochus pulchripes.**

Exochus pulchripes, Cress., Trans. Am. Ent. Soc., ii. p. 38, ♂.

Orizaba.

Genus METOPIUS, Panz.

1. **Metopius femoratus**, n. sp.

♂.—Black, with a short, pale yellow, subsericeous pubescence; face, anterior orbits, palpi, base of antennæ beneath, tegulæ except base, line before, a short one beneath, two obscure lines on posterior middle of mesothorax, tip of scutellums, longitudinal mark on each side of metathorax, large, irregular mark on pleura anteriorly, four anterior legs, posterior trochanters, base and apex of their femora, their tibiæ, base of their tarsi, first segment of abdomen except base, apical margin of the second, slightly interrupted medially, apical half of third and fourth, and the remaining segments, except base more or less, all lemon-yellow; antennæ brown-testaceous beneath, paler at base; four anterior femora beneath, tips of posterior tibiæ, of all the tarsi, and base of first abdominal segment, brownish; wings subhyaline, broadly yellowish along costa, marginal cell faintly dusky. Strongly punctured; the shield-shaped front bounded by a sharp carina; antennæ nearly two-thirds the length of body, filiform; scutellum quadrate, flat, sides strongly reflexed, and acutely and strongly produced behind in shape of a tooth, apex of scutellum rounded; metathorax with obsoletely defined elevated lines; legs short and rather slender, the posterior femora short and much swollen; abdomen long, slightly thickened at base, strongly and confluently punctured, first segment gibbous at base, apical margin of remaining segments bisinuate. Length 5 lines.

Cordova. A beautiful species.

2. **Metopius scutatifrons**, n. sp.

♂.—Black, opaque, clothed with a short, thin, pale, subsericeous pubescence; entire margin of the shield-shaped front, spot between antennæ, sometimes upper margin of prothorax and apical margin of scutellum, tip of first and apical margin of third and fourth abdominal segments more or less, whitish; antennæ brownish beneath, paler at base; legs more or less brownish; wings hyaline, marginal cell fuscous. Densely punctured, the abdomen very coarsely so; the shield-shaped front bounded by a very sharp carina; antennæ about as long as head and thorax, robust, fili-

form; thorax rather strongly and very closely punctured; scutellum rugose, sides very strongly reflexed and acutely produced behind, the tooth bent downward, apex of scutellum truncate; metathorax with moderately distinct elevated lines; posterior femora robust; abdomen elongate, clavate, first segment much longer than broad, with several acute, longitudinal carinæ, remaining segments with a medial longitudinal carina, the second and third very coarsely and confluently punctured, the remaining segments gradually less coarsely sculptured. Length 5½ lines.

Orizaba. (Sumichrast, No. 35.)

Genus EPIRHYSSA, Cresson.

Epirhyssa mexicana, n. sp.

♀.—Lemon-yellow; line on vertex from eye to eye and covering ocelli, sutures of mesothorax, basal sutures of scutellum and of metathorax, tarsi, and narrow apical margin of abdominal segments, fuscous; antennæ black; wings yellow-hyaline, dusky at tips, the anterior pair with a fuliginous spot at apex. Shining, smooth; mesothorax coarsely, transversely rugose. Length 8–10 lines.

Orizaba; Cordova.

Genus EPHIALTES, Grav.

Ephialtes atriceps, n. sp.

♀.—Pale ferruginous; head, antennæ, most of prothorax, sutures of thorax above, and transverse spot on lateral apical margin of second and three following abdominal segments, black; scape beneath, tegulæ, line before and most of legs, white; posterior coxæ and femora except tips, pale honey-yellow; line on four anterior femora above and the tarsi dusky; wings hyaline, iridescent. Elongate, narrow, smooth, and shining; head subglobose; antennæ short, slender; metathorax smooth, rounded; abdomen subsessile, very long, of uniform width, segments 2–5 above with a swelling on each side of middle; areolet subtriangular. Length 6¼ lines.

Orizaba.

Genus EPIMECIS, Brullé.

Epimecis? thoracicus, n. sp.

♀.—Head, antennæ, and abdomen, black; palpi, thorax, and four anterior femora and tibiæ, pale honey-yellow; extreme tips of metathorax, tips of anterior tarsi, four posterior tarsi, posterior trochanters, base of their femora, a band near the tips, interrupted above, and their tibiæ except middle exteriorly, black, remainder of the legs white; wings hyaline, subiridescent, nervures and stigma black; venter white; ovipositor honey-yellow, sheaths black. Form long, slender, cylindrical, surface smooth and shining, subpubescent; antennæ as long as abdomen, setaceous; mesothorax strongly trilobed, narrowed anteriorly into a neck; metathorax smooth and polished, a deep channel on basal middle; wings narrow, areolet wanting; legs long and slender, claws simple, pulvilli very large; abdomen long, sessile, depressed, sides parallel, segments longer than wide, subquadrate, with a blister-like elevation on each side, and a depression on basal middle; ovipositor half as long as abdomen. Length 5 lines.

Orizaba.

Genus THERONIA, Holmgren.

1. Theronia montezuma, n. sp.

♂ ♀.—Lemon-yellow, shining; tips of mandibles, antennæ, except base beneath, posterior tarsi, and sheaths of ovipositor black, ovipositor chestnut-red; vertex, occiput, and three narrow longitudinal lines on mesothorax pale brownish, sometimes indistinctly so; wings yellowish-hyaline, dusky at apical margin, a fuliginous spot at tip of marginal cell, nervures black; antennæ filiform, more than one-half the length of the body, the joints short; mesothorax slightly trilobed, the middle lobe grooved down the middle; scutellum with erect pubescence, the lateral basal margins acutely carinate; metathorax rounded, with a strongly-developed, acute, arcuated carina across the middle, less strongly developed in the ♂; wings ample, areolet subquadrangular, oblique; legs robust, posterior coxæ compressed; abdomen subsessile, narrow, more or less clavate, smooth and shining; first segment narrow, longer than the second (which is almost equilateral), with two longitudinal elevated lines, divergent at base, and confluent at tip; second

segment with a fovea on each side at base; ovipositor not half the length of the abdomen. Length 6–7½ lines.

Orizaba; Cordova; Mirador. (Sumichrast, No. 10.) Common. The mesothorax has sometimes a black line over the tegulæ, and the abdomen is sometimes more or less fuscous at tip; this latter is doubtless owing to discoloration.

2. **Theronia toltoca, n. sp.**

♂ ♀.—Honey-yellow, smooth and shining; face, thorax laterally and beneath, and four anterior coxæ lemon-yellow; antennæ, except scape and posterior tarsi, black; wings hyaline, with fuliginous spot at tip of marginal cell, nervures and stigma black; apex of abdomen more or less dusky; form long, slender; antennæ as long as body, slender, filiform, joints short, the sutures not very distinct; mesothorax trilobate in front; metathorax with a sharply-defined arcuate carina across the middle; wings ample; legs rather robust; abdomen same shape in both sexes, long, slender, and clavate, subpetiolate, first segment more than twice longer than wide, sides parallel, surface above even, smooth, and polished; ovipositor of ♀ rather longer than first segment of abdomen. Length 5–6½ lines.

Orizaba. (Sumichrast, No. 77.)

3. **Theronia mellosa, n. sp.**

♂ ♀.—Honey-yellow, smooth and shining; face, thorax laterally and beneath, and base of four anterior legs, more conspicuous in ♂, lemon-yellow; tips of mandibles, antennæ except base beneath, sometimes the basal margin of metathorax, tips of posterior tarsi and the ovipositor black; wings hyaline, with a rather small, rounded, black spot at tip of marginal cell, nervures and stigma black; in some specimens the second, third, and fourth segments of abdomen have blackish stains at base; form more slender than usual; antennæ as long as body, filiform, joint 3 longer than 4, sutures not very distinct; mesothorax subtrilobed in front; metathorax smooth, polished, with a sharply-defined arcuate carina across the middle; wings ample; legs slender, posterior pair robust; abdomen subpetiolate, smooth, polished, fusiform or clavate in ♀, long, cylindrical in ♂, first segment more than twice longer than broad, sometimes slightly narrowed at base, with two central longitudinal carinæ; ovipositor slender, longer than first segment of abdomen. Length 4–5 lines.

Orizaba; Cordova.

4. **Theronia Tacubaya, n. sp.**

♂ ♀.—Lemon-yellow, shining; tips of mandibles, spot on each side of ocelli, posterior margin of occiput, antennæ above, three lines on mesothorax, sutures of thorax, middle or whole of transverse carina on metathorax, sometimes one or two lines down the middle of posterior slope, a line on posterior coxæ behind, sometimes obsolete, a line on all the femora, and sometimes on tibiæ within, posterior tarsi of ♂, three lines on disk of first abdominal segment, sometimes confluent, and broad basal margins of remaining segments, narrow on apical ones, black or brown-black; antennæ beneath reddish-brown, paler at base, scape yellow beneath, the extreme apical joint fulvous; wings yellowish-hyaline, with a golden reflection, apical margins faintly dusky; nervures and stigma fulvous; posterior tibiæ of ♂ and tarsi of ♀ more or less dusky; ovipositor brownish, paler at base; antennæ about as long as body, filiform, basal joints short and indistinctly defined; mesothorax slightly trilobed, more prominently so in ♂; metathorax rounded, sloping gradually to apex, basal middle sulcate with a strongly-developed transverse, somewhat arcuate, acute carina on disk, sometimes abbreviated; areolet quadrangular, oblique; legs subrobust; abdomen oblong ovate in ♀, longer and narrower in ♂, subsessile, subdepressed; first segment twice longer than wide, sides parallel, flattened above, with two elevated longitudinal medial lines, less developed in ♂; ovipositor of ♀ nearly as long as abdomen. Length 4–6 lines.

Orizaba; Cordova. (Sumichrast, No. 65.) Common. Varies much in size, and the markings vary from pale-brown to black.

5. **Theronia consimilis.**

Pimpla consimilis, Cress., Proc. Ent. Soc. Phil., iv. p. 37.

Orizaba; Cordova; Mirador. (Sumichrast, Nos. 49, 64.) This common species occurs also in Cuba, and is closely allied to *Tacubaya;* it is, however, more shining, with the metathorax always immaculate except basal suture, and the wings are differently colored, having a conspicuous dark spot at tip of marginal cell. It varies in length from $3\frac{1}{2}$–$5\frac{1}{2}$ lines.

Genus PIMPLA, Fabr.

1. **Pimpla cæruleata, n. sp.**

♀.—Brilliant steel-blue, changing to purple in certain lights; antennæ, tarsi, and sheaths of ovipositor dull black; tips of an-

terior femora and their tibiæ whitish in front; wings fuliginous, with a brilliant purple reflection, changing to golden in certain lights, nervures and stigma black; antennæ as long as the body, slender, thread-like, third joint very long, longer than the two following; mesothorax opaque; metathorax transversely striated above, scarcely so on the sides; first segment of abdomen angular when viewed in profile, the basal half with a sharp ridge on each side, apical half flattened, the sides not raised; sculpture very fine and dense, apex smooth and shining; ovipositor about half the length of abdomen. Length 8–9 lines.

♂.—Of a brighter blue than the ♀, and without any purplish reflection; palpi white; third joint of antennæ not as long as the two following; mesothorax shining, sometimes slightly longitudinally impressed on each side anteriorly; metathorax more finely striated than the ♀, sometimes obsoletely so; wings hyaline, iridescent, more or less smoky at tips; anterior coxæ in front, their trochanters, their femora in front, most of their tibiæ and tarsi, the intermediate femora at tips, and their tibiæ in front, whitish; abdomen more linear than that of the ♀, more shining, the first segment scarcely angular in profile, and the lateral and apical submargins of the segments much more deeply impressed. Length 4½–8 lines.

Orizaba; Cordova. This may prove identical with *P. cærulea* Brullé, from Brazil.

2. **Pimpla croceipes**, n. sp.

♂ ♀.—Black, shining, more so in the ♂; palpi, base of antennæ beneath, and tegulæ of ♂, and scutellum, yellow; antennæ brown, paler at base and beneath, especially so in ♀; legs orange-yellow, paler at base, posterior coxæ and tips of all the tarsi black; wings hyaline, iridescent, nervures and stigma black; antennæ nearly as long as the body, slender, thread-like, third joint as long as the two following; mesothorax feebly sculptured, slightly impressed longitudinally; metathorax finely striated transversely, smooth at base, pubescent on the sides; basal segment of abdomen as in *cæruleata;* ovipositor of ♀ about half the length of the abdomen. Length 3–5 lines.

Orizaba. (Sumichrast, No. 50.) A very common species.

3. **Pimpla punicipes**, n. sp.

♀.—Deep black, opaque; antennæ fuscous; legs entirely dark

honey-yellow except tarsi, which are dusky; wings hyaline, iridescent, base of stigma pale; mesothorax shining; metathorax finely transversely aciculate, the apex truncate, smooth and shining; abdomen densely punctured, the apical margin of segments smooth, shining, and paler. Length 3½ lines.

Orizaba. (Sumichrast, No. 102.)

4. **Pimpla feralis**, n. sp.

♂.—Differs from *punicipes* only by the posterior tibiæ and tarsi being blackish, the former having a white annulus near base; the metathorax not transversely aciculate, and the abdomen uniformly very densely and finely sculptured, the apical margin of the segments not shining. Length 2½–3¼ lines.

Orizaba. (Sumichrast, No. 115.)

5. **Pimpla crassicauda**, n. sp.

♀.—Head, prothorax, and metathorax black; abdomen fuscous, the middle segments paler; mesothorax, scutellums, pleura, and flanks of metathorax honey-yellow; antennæ pale fuscous, whitish at base beneath; tegulæ, line before, and most of legs white, posterior coxæ and femora yellow; wings hyaline, iridescent; shining; abdomen subsessile, rather broad, punctured, the segments with a slight lateral swelling above; ovipositor nearly as long as body, sheaths black and incrassate. Length 4 lines.

Orizaba.

6. **Pimpla albipes**, n. sp.

♀.—Head black, pubescent, palpi white, antennæ black above, brownish beneath, scape whitish beneath; thorax bright honey-yellow, smooth and polished, the prothorax more or less, scutellar region, and the metathorax or sometimes its base only, black; tegulæ and spot or line before, white; wings hyaline, iridescent, stigma luteous; legs white, extreme base and apex of posterior tibiæ, and tips of all the tarsi, dusky, sometimes the posterior coxæ and femora are pale honey-yellow; abdomen reddish-brown, or obscure luteous, the first segment and apical margin of remaining segments more or less black; ovipositor black. Antennæ as long as abdomen, setaceous; metathorax perfectly smooth, polished, and rounded; areolet of anterior wing triangular, somewhat oblique; legs long and slender; abdomen elongate, robust, strongly punctured, shining, first segment impunctured, quadrate, excavate at base, remaining segments transverse, sub-

quadrate, the disk transversely elevated; ovipositor as long as abdomen, exserted from the extreme tip, robust, sheaths densely pilose. Length 3 lines.

Orizaba.

7. **Pimpla semisanguinea**, n. sp.

♀.—Black; clypeus brown, the base and apex, and also the palpi, pale yellow; antennæ brown-black, paler at base beneath; basal half of tegulæ, elevated spot beneath, scutellum and post-scutellum, the four anterior coxæ and trochanters, a spot at the base of the posterior coxæ, pale yellow; thorax clothed with a very short, fine, pale, sericeous pile, especially dense on the sides of the metathorax; wings hyaline, nervures and stigma brownish; legs yellowish-fulvous, the posterior pair somewhat ferruginous; abdomen dull ferruginous, ovipositor black. Clypeus transversely excavated, eyes large; antennæ as long as the body, slender, thread-like; metathorax transversely striated, abruptly truncated behind; abdomen finely granulated, smoother at apex; ovipositor about half the length of the abdomen. Length 5¾ lines.

Orizaba. (Sumichrast, No. 33.)

8. **Pimpla Sumichrasti**, n. sp.

♀.—Lemon-yellow; tips of mandibles and spot on each side of ocelli, antennæ, except scape beneath, three broad lines on mesothorax, base and apex of scutellum, apex of postscutellum, a narrow undulate line at base of metathorax, and a large spot on its posterior face, wedge-shaped mark on four posterior coxæ, tips of posterior tibiæ and of all the tarsi, transverse spot near base of first segment, its extreme apical margin, basal margin of second and three following segments, broad on the second and third and very narrow on the fifth, the sixth and seventh segments entirely, except the extreme sides, and the ovipositor and sheaths, black; legs tinged with fulvous, middle of posterior femora, and tips of intermediate tibiæ within, stained with fuscous; wings yellowish-hyaline, with a large violaceous-black macula at tip of marginal cell, nervures and stigma fulvous. Antennæ long, slender, thread-like, basal joints of flagellum very long; mesothorax slightly trilobed; metathorax striated across the middle, smooth at base, abruptly truncated at tip; wings ample, areolet triangular; legs robust; abdomen of the usual form, sessile, depressed, closely and deeply punctured, first segment, base of second, and the two

apical segments smooth and polished, the former excavated at base; ovipositor about half the length of the body. Length 7½ lines.

Cordova. This is an elegant species, with the apical spots at tip of anterior wings very conspicuous and brilliant.

9. Pimpla azteca, n. sp.

♀.—Honey-yellow, abdomen tinged with ferruginous; face, thorax beneath, and base of anterior legs yellow; antennæ black, yellowish at base beneath; mandibles at tips, narrow basal and apical margins of metathorax, tips of four anterior tarsi, and the posterior pair except extreme base, basal margin of second, third, and fourth segments of abdomen more or less, and the ovipositor, black; wings hyaline, with a large black spot at tip of anterior pair, nervures and stigma black. Antennæ as long as body, slender, setaceous, with joint 3 as long as 4 and 5 together; mesothorax subtrilobed, smooth and shining; metathorax smooth and rounded; abdomen smooth and shining, elongate, fusiform, with lateral blister-like elevations on segments 2–5, first segment a little longer than broad. Length 5½ lines.

Orizaba. (Sumichrast, No. 66.)

10. Pimpla marginipennis, n. sp.

♀.—Bright lemon-yellow; tips of mandibles, antennæ except scape beneath, three stripes on mesothorax, anterior suture of pleura, basal suture of metathorax, spot at extreme apex, intermediate tarsi except basal joint, posterior pair except base of first joint, narrow basal margins of abdominal segments 1–5 and apical margin of first segment, all black or blackish; mesothorax polished; metathorax smooth, rounded above and polished; wings golden-hyaline, apex broadly fuliginous, slightly paler at extreme tip, nervures and stigma black; legs robust, abdomen impunctured; ovipositor as long as first and second segments, piceous, sheaths black. Length 6 lines.

Cordova.

11. Pimpla zonata, n. sp.

♀.—Brown-black; head except stripe on vertex between summit of eyes, another behind on occiput, scape beneath, prothorax, four stripes on mesothorax, tegulæ, base of scutellum, postscutellum, pleura, two large triangular marks on metathorax, flanks, most of legs, base and apex of first abdominal segment, and narrow

apical margins of remaining segments, dilated laterally, bright lemon-yellow; wings hyaline, costa broadly fuscous, stigma pale honey-yellow; flagellum with a pale fulvous annulus near base; line on femora beneath, and another on posterior coxæ fuscous; narrow apical margin of second and lateral margin of three following segments black. Opaque; antennæ slender, filiform; mesothorax trilobate, the middle lobe channelled medially; scutellum flattened; metathorax short, smooth, rounded; wings long, areolet elongate, irregularly quadrangular; legs rather short and subrobust; abdomen subpetiolate, clavate, first segment smooth, channelled centrally, remaining segments densely punctured, with a subapical transverse ridge on second, third, and fourth segments. Length 6½–8 lines.

Orizaba. (Sumichrast, No. 101.)

12. **Pimpla zapotesa**, n. sp.

♂ ♀.—Lemon-yellow; antennæ dull testaceous, brown at base above and at tips, scape yellow beneath; occiput, spot behind insertion of antennæ, confluent with another inclosing ocelli, black; three broad lines on mesothorax, its lateral and posterior sutures, the abrupt sides of scutellum, sutures of pleura, confluent with a line beneath the tegulæ, basal sutures of metathorax, confluent with two medial, longitudinal lines, which are again confluent posteriorly, line on posterior coxæ exteriorly, medial line on first segment of abdomen, contracted in the middle, and the remaining segments above, except their apical margins, black; the apical yellow margin of the third segment is much broader than in any of the others, while that on fourth and remaining segments is very narrow, and almost obsolete on the last segment; posterior femora above, their tibiæ at base and apex and the tips of all the tarsi, fuscous; wings yellowish-hyaline, nervures and stigma orange-yellow; ovipositor blackish. Antennæ about as long as the body, slender; thorax densely punctured; base of metathorax with two short, elevated, longitudinal lines at base; abdomen slightly thickened posteriorly, densely and rather roughly sculptured, the segments contracted at base, first segment with two elevated, longitudinal carinæ; ovipositor about one-third the length of the abdomen. Length 4½–6 lines.

Orizaba. (Sumichrast, No. 53.)

13. **Pimpla ? chichimeca**, n. sp.

♂.—Lemon-yellow, thinly pubescent; tips of mandibles, line

across vertex, inclosing ocelli, posterior margin of occiput, sutures of thorax above and beneath, three broad lines on mesothorax, tip of scutellum, an elongate conical spot on middle of metathorax, sides of posterior coxæ, the femora behind, base of first segment of abdomen, and the remaining segments except apical submargins, brown or brown-black, extreme apical margins of the segments black; antennæ also brown with a broad, indistinctly defined testaceous annulus before the middle, the scape yellow beneath; wings hyaline, faintly yellowish, iridescent, nervures and stigma orange-yellow. Eyes large, face small, base of clypeus arcuate, its tip emarginate; antennæ rather stout, rather more than half the length of the body, basal joints of flagellum short and subequal; mesothorax prominently trilobed, the central lobe grooved down the middle, metathorax rounded, sloping to the base; smooth and shining, with long, blackish pubescence on the sides; legs subrobust; areolet of anterior wings subrhomboidal, more longitudinal than usual in *Pimpla;* abdomen subpetiolate, the first segment nearly as long as the two following, and much narrower, parallel on the sides, with two elevated longitudinal lines, strongly divergent at base; second segment about as wide at base as the apex of the first segment, gradually dilated posteriorly, remaining segments strongly transverse; second and following segments densely sculptured, contracted at base and clothed with a black pubescence, which is longer on the sides. Length 4–5½ lines.

Orizaba. (Sumichrast, No. 81.) Much like *zapoteca* in ornamentation, but very different in form.

14. Pimpla ichneumoniformis, n. sp.

♂.—Black, thinly pubescent; antennæ flavo-testaceous, dusky at tips; tegulæ, spot beneath, obscure stains on sides of metathorax, four anterior legs in front, tips of posterior femora obscurely, obscure stains on sides of first three abdominal segments, and narrow apical margins of all the segments, more or less obsolete, obscure honey-yellow; wings hyaline, tinged with yellow, especially along the costa, nervures and stigma honey-yellow; thorax opaque, tip of abdomen shining. Form elongate, slender; head transversely compressed, eyes large, clypeus concave; antennæ two-thirds as long as body, slender, filiform, joints distinct, the third not quite as long as fourth and fifth together; mesothorax convex, finely shagreened; scutellum subconvex; metathorax rounded, transversely striated, the extreme tip smooth and shin-

ing; wings long, narrow, areolet small, triangular, subpetiolate, receiving the recurrent nervure at the tip; legs slender, claws long, hooked, simple; abdomen long, subpetiolate, closely and rather finely punctured, first segment more than twice longer than broad, sides parallel and carinate, base excavate; second segment subtriangular, basal foveæ large, oblique. Length 6½ lines.

Orizaba. Considerably like certain species of *Ichneumon* in form of body.

15. **Pimpla? pulcherrima**, n. sp.

♀.—Deep black, shining; clypeus, palpi, tegulæ, legs (except coxæ, four posterior trochanters, tips of posterior tibiæ and their tarsi entirely), and first four segments of abdomen, bright lemon-yellow; wings yellow-hyaline, with a broad black fascia beneath stigma and another paler band at tip of both pairs; stigma black, nervures yellow where not covered by the black bands. Antennæ longer than head and thorax, filiform; thorax smooth and polished, mesothorax trilobed in front; metathorax smooth and rounded; wings ample, areolet large, subtriangular, receiving the recurrent nervure at the tip; legs short, subrobust, tarsi shorter than tibiæ, tibial spurs short and robust, posterior femora with a short blunt tooth beneath, midway between base and apex; abdomen elongate, convex, sessile, upper surface very uneven, each segment, except first, with a blister-like elevation on each side, transverse, first segment equilateral, deeply excavated at base; ovipositor as long as abdomen, sheaths pubescent. Length 6¼ lines.

Cordova. A very handsome and anomalous insect. Readily distinguished by the beautifully banded wings, and toothed posterior femora.

16. **Pimpla braconoides**, n. sp.

♀.—Yellow-ferruginous; head, antennæ, collar, and legs black; wings yellowish-fuscous, darker at apex. Smooth and shining; abdomen subsessile, first segment with two prominent longitudinal carinæ, the remaining segments with two prominent transverse folds on each; legs short, robust; wings ample, areolet small, petiolated. Length 4¾ lines.

Orizaba. This has very much the general appearance of certain species of *Bracon*.

17. **Pimpla atriceps**, n. sp.

♂.—Bright honey-yellow, shining; head, antennæ, collar, an-

terior margin of prothorax, tips of posterior coxæ, their trochanters, anterior femora behind, tips of four posterior femora, tips of their tibiæ, and their tarsi entirely black; palpi, four anterior coxæ and trochanters white; wings fuliginous, iridescent, nervures and stigma brown; head transverse, pubescent, face polished, clypeus flat, ocelli prominent; antennæ filiform, as long as abdomen, thorax smooth and polished, mesothorax subtrilobed in front; metathorax perfectly smooth; areolet of wings small, triangular, subpetiolated; legs short, rather slender, tibial spurs short and robust, claws long, slender, simple; abdomen elongate-ovate, sessile, depressed, shining, second and following segments transverse, with a medial, subtriangular, blister-like elevation, the apical margin also elevated; first segment narrowed at base with two sharply-defined carinæ on the disk, base excavate. Length 3 lines.

Cordova.

Genus GLYPTA, Grav.

1. Glypta longula, n. sp.

♀.—Black, shining; clypeus, mouth, upper margin of prothorax, and tips of scutellums white; pleura and scutellum reddish; mesothorax strongly tinged with reddish; wings hyaline, iridescent; legs white, posterior coxæ within and at tips beneath, spot at base of their trochanters, tips of four posterior femora and tibiæ, spot near base of the latter, their tarsi, except base of first three joints, line on posterior femora beneath and tips of anterior tarsi, black; form long, subcylindrical, closely punctured; antennæ as long as body and slender; mesothorax strongly trilobed; metathorax shining, with two sharply-defined transverse carinæ; abdomen closely and strongly punctured, the oblique lines deeply impressed; ovipositor half the length of abdomen. Length 3½ lines.

Orizaba. (Sumichrast, No. 88.)

2. Glypta albopicta, n. sp.

♂.—Black, shining; clypeus, mouth, scape beneath, collar, margins of prothorax, pleura, except spot beneath wings and sutures, tegulæ, short line beneath, scutellum, flanks of metathorax, an uneven longitudinal line on each side above, four anterior coxæ, all the trochanters, lateral margin of first abdominal segment, and two spots on the lateral margin of the second, third,

and fourth segments all white; mesothorax red, middle lobe black; wings hyaline, iridescent; legs honey-yellow, intermediate trochanters at base and apex of their tibiæ, apex of intermediate tibiæ and all the tarsi blackish, tibial spurs and middle of posterior tibiæ whitish; form long and slender; antennæ nearly as long as body; mesothorax strongly trilobed, smooth and shining; scutellum convex; metathorax with sharply-defined elevated lines; legs slender; abdomen nearly three times the length of head and thorax, rather thickly punctured, the oblique lines deeply impressed. Length 4–5½ lines.

Orizaba. (Sumichrast, No. 150.)

3. **Glypta decolorata**, n. sp.

♂.—Smooth and shining; ferruginous; head, spot on prothorax above, another on posterior margin, lateral region of scutellum, central stripe of metathorax dilated at tip, and base and apex of first abdominal segment black; clypeus, mandibles, spot above, palpi, line on collar, tegulæ, line before, apex and lateral margin of scutellum, postscutellum, ovate spot on side of pleura, and the legs whitish; tips of tarsal joints blackish; antennæ fuscous; wings hyaline. Length 4½ lines.

Orizaba. (Sumichrast, No. 119.)

Genus LYCORINA, Holmgren.

Before seeing Holmgren's description of this genus I had referred (in MS.) the species described below to a new genus which I had named *Toxophoroides*, from the resemblance in form to the Dipterous genus *Toxophora*. Not feeling sure that the species in question belongs to *Lycorina*, I add a description of the form and sculpture.

Head subtransverse; clypeus small; face flat; eyes large, ovate; ocelli large, prominent; occiput and cheeks flat; antennæ long, slender, filiform; thorax short, robust, gibbous; mesothorax long, subconvex; scutellum protuberant, convex; metathorax very short, abrupt behind; prothorax and pleura excavated; wings without areolet; legs slender, ungues cleft; abdomen sessile, depressed, first segment longer than broad, remaining segments transverse, second, third, and fourth with a median, triangular-shaped, deeply impressed line inclosing a smooth, convex, triangular space; ovipositor long, exserted from extreme tip of abdomen.

Lycorina? apicalis, n. sp.

♀.—Lemon-yellow, clothed with a short, thin, fine, pale pubescence; spot inclosing ocelli, posterior margin of occiput, antennæ except base beneath, three stripes on mesothorax, the middle one abbreviated behind, the others confluent behind, a sutural line on each side of pleura anteriorly, dilated above and beneath, a spot beneath posterior wing, a line at base of metathorax, dilated on each side, large mark on outside of posterior coxæ, their trochanters, exteriorly, tips of their tarsi, an oblique spot on each side of the first four segments of abdomen, almost confluent, those on the first segment situate in the middle, the remainder at the base, and the ovipositor black; wings hyaline, iridescent, a fuscous spot at tip of anterior pair; legs and apex of abdomen tinged with fulvous; antennæ as long as body; thorax and abdomen with deep punctures; ovipositor two-thirds the length of abdomen. Length 3½ lines.

Cordova. A beautiful insect. Shorter and more robust than *Glypta*, with the sculpture of the abdomen similar.

Genus LAMPRONOTA, Curtis.

1. Lampronota mexicana, n. sp.

♀.—Head, antennæ, pro-, meso-, and metathorax above black; annulus on antennæ white; sides of face, mouth, anterior orbits, cheeks, collar, two lines on mesothorax hooked anteriorly, tegulæ, spot beneath, scutellum, anterior coxæ, and spot on pleura before middle coxæ yellowish; pleura, sides and tip of metathorax, legs, and more or less of abdomen pale ferruginous or honey-yellow; posterior coxæ with a black spot behind; first and second segment of abdomen above, and narrow apical margins of third and fourth segments, sometimes only the first, black; wings hyaline, nervures brown. Opaque, areolet large, subtriangular; claws pectinate. Length 7½ lines.

♂.—Antennæ very long and slender, entirely black; head, prothorax, pleura, metathorax, and legs pale lemon-yellow; metathorax with a black spot above; posterior tarsi blackish; abdomen subcylindrical, black, with base of second, third, and fourth segments pale. Length 8 lines.

Orizaba.

2. **Lampronota astecа, n. sp.**

♀.—Dull luteous; head, antennæ, pro- and mesothorax, scutellar region, and most of abdomen above black; face, mouth, orbits, line on collar, discal spots on mesothorax, two spots in front, scutellum, and base of first and second abdominal segments, spiled white; annulus on antennæ and broad apical margins of abdominal segments white; wings hyaline; four anterior tarsi dusky, posterior pair pale yellow; shining, slender; metathorax with a transverse carina behind middle, prominent on each side; abdomen narrow, subpetiolate, subcylindrical; areolet moderate, triangular, subpetiolate; claws pectinate. Length 5½ lines.

Orizaba.

3. **Lampronota bella, n. sp.**

Lemon-yellow (most of antennæ and apical half of abdomen wanting); spot covering ocelli and middle of occiput, antennæ, except scape beneath, three short broad stripes on mesothorax, the middle one abbreviated behind, the lateral one before, scutellar region, two triangular marks at base of metathorax confluent on basal middle and extending down on each side to middle coxæ, large spot on posterior coxæ, base of their trochanters, middle of first abdominal segment, and broad basal margin of remaining segments black; posterior femora and tibiæ tinged with honey-yellow; wings hyaline, iridescent, nervures pale; shining, slender; areolet small, petiolate, triangular; claws pectinate. Length, say 3½–4 lines.

Cordova. (Sumichrast, No. 143.)

4. **Lampronota orbitalis, n. sp.**

♀.—Head black; orbits interrupted behind, face, except a central stripe and lobed spot beneath each antenna, clypeus, and mouth yellowish-white; antennæ black; mesothorax honey-yellow, polished, a yellowish-white line on each side before tegulæ, dilated anteriorly; prothorax black, margined with yellowish-white; scutellum honey-yellow, a yellowish-white spot on each side, the lateral region black; metathorax black, flanks yellowish-white; pleura honey-yellow, a large mark on each side, tegulæ, and a line beneath, yellowish-white; wings hyaline, iridescent; legs whitish, femora and tibiæ tinged with luteous; stripe on outside of four posterior coxæ, posterior pair within, extreme base of the four posterior trochanters and of their femora, tips of their tibiæ, and of their

tarsi, black; abdomen black, shining, segments 2–5, tinged laterally with brownish, apical margins of segments narrowly yellowish; ovipositor black. Form slender, cylindrical; antennæ as long as body, setaceous; mesothorax smooth and polished; metathorax transversely rugulose; anterior wing without areolet; legs long and slender, claws pectinate; abdomen subcylindrical, smooth and polished, surface even; ovipositor as long as body, very slender. Length 2¾ lines.

Orizaba.

5. **Lampronota? jucunda**, n. sp.

♀.—Head, antennæ, and thorax black; face, except central dot, mouth, orbits, annulus on antennæ, collar, tegulæ, spot beneath, lunate spot on disk of mesothorax, scutellum, spot behind, large spot on side of pleura, spot on flank of metathorax, two small spots at base, connected laterally with a band near apex, anterior coxæ, spot on two posterior pairs, base of first segment, and narrow apical margin of first and second segments white; middle of first and second segments, and dot on each side of third segment black; legs and remainder of abdomen pale ferruginous; wings hyaline; opaque; abdomen subsessile; anterior wing without areolet; claws petinate. Length 5 lines.

Orizaba.

Genus MENISCUS, Schiödte.

1. **Meniscus crassitarsus**, n. sp.

♀.—Black, shining; orbits, face, except central black stripe, clypeus, mandibles, except tips, broad annulus on antennæ, line on each side of mesothorax, before tegulæ, dilated anteriorly, two spots on the disk; sometimes confluent, spot beneath tegulæ, scutellum except extreme apex, metathorax except a large transverse medial black mark, a large oblique mark on each side of pleura extending beneath, an oblique line beneath posterior wing, coxæ and trochanters, base of first segment of abdomen, apical margins of all the segments, broad on the second and third, and uneven, subinterrupted bands on the middle of apical segments, white or yellowish-white; wings hyaline, subiridescent, apex faintly dusky, nervures and stigma black; stripe on four posterior coxæ and trochanters behind, intermediate femora above, posterior pair entirely, tips of four anterior tibiæ, and the four anterior tarsi

entirely, black, rest of legs yellow. Middle of face protuberant; antennæ as long or longer than body, slender, tapering much at apex; mesothorax smooth and polished, closely punctured in front; scutellum convex, punctured; metathorax rugose, coarsely and transversely so on disk; wings narrow, anterior pair without areolet; legs rather slender, tarsi incrassate, much flattened, claws pectinate; abdomen smooth and polished, depressed at base, subcompressed at tip; ovipositor about one-third as long as abdomen, compressed and sword-shaped, sheaths slender, pubescent, dilated at tips. Length 4½–5 lines.

Orizaba. (Sumichrast, No. 63.)

2. **Meniscus mexicanus, n. sp.**

♀.—Differs from *crassitarsus* as follows: The antennæ are longer; the upper margin of prothorax is white, a large quadrate whitish spot on disk of mesothorax; metathorax black, with a triangular mark on basal middle, the apex and flanks whitish; mesothorax uniformly, closely punctured; apex of wings dusky; legs yellow, spot at base of four posterior coxæ, the posterior pair within, stripe on four anterior femora behind, the posterior pair except base before, tips of their tibiæ, and the four anterior tarsi more or less, black; all the tarsi slender; claws pectinate; abdomen obscure yellowish-white, first segment, except base which is whitish and extends down the middle for a short distance, the second segment, except a large square mark on basal middle and the apical margin, and a fascia across middle of third segment, margining the sides anteriorly, black; apical segments more or less stained with dusky; ovipositor shorter and less robust. Length 5½ lines.

Cordova.

3. **Meniscus? alternatus, n. sp.**

♂.—Lemon-yellow, opaque, abdomen shining; spot on vertex, covering ocelli and extending to base of antennæ, occiput, the antennæ, except scape beneath and very narrow annulus on flagellum, medial transverse line on prothorax, three longitudinal lines on mesothorax, the medial one broad and entire, the others abbreviated before, tip of scutellum, postscutellum, scutellar region, basal suture of metathorax, a transverse medial band, the extreme apex, a curved line on pleura anteriorly, a medial spot on each side, spot on outside of middle coxæ, the posterior pair

behind, their femora, tips of their tibiæ, extreme tips of all the tarsi, broad band on middle of first abdominal segment, and the four following segments above, except broad apical margin, black; legs tinged with orange; wings yellowish-hyaline, faintly dusky at tips, nervures and stigma honey-yellow. Antennæ as long as body and very slender; middle of face protuberant; thorax finely granulated; scutellum convex; metathorax rugulose; legs slender; claws pectinate; abdomen shining, delicately and closely punctured, stigmatic tubercles prominent. Length 4–5¼ lines.

Cordova.

4. **Meniscus? orbitalis**, n. sp.

♀.—Black; orbits, clypeus, spot on mandibles, annulus on antennæ, line on collar, slender furcate mark on mesothorax, tegulæ, spot beneath, scutellum, spot behind, spot on flanks of metathorax, double spot above, large irregular mark on pleura, posterior tarsi except base and apex, anterior coxæ, spot at base of two posterior pairs, base of first abdominal segment, apical margin of all the segments, very slender on fourth, pale lemon-yellow; legs and apex of abdomen beneath ferruginous; tips of four anterior tarsi, tips of posterior trochanters, tips of their tibiæ and base and apex of their tarsi black; wings hyaline, iridescent. Opaque; areolet wanting; claws simple. Length 4–5½ lines.

Cordova.

Genus PHYTODIETUS, Grav.

1. **Phytodietus gracilicornis**, n. sp.

♂ ♀.—Lemon-yellow, smooth and polished; spot on vertex, covering ocelli, and confluent with a spot on occiput, antennæ, except scape beneath and broad annulus on flagellum, middle of prothorax, dilated laterally, mesothorax, except two spots in front and a square one on the disk, scutellar region, base of metathorax irregularly, and dilated on each side above, two dots on extreme apex in ♀, mark beneath anterior wing, spot beneath posterior wing and pleura beneath, except two medial lines in ♀, line on outside of posterior coxæ, line on four anterior femora beneath in ♀, the posterior pair except base and apex in ♀, only a line above in ♂, tips of tarsi, and abdomen above except rather broad apical margins, black; femora, tibiæ, and four anterior tarsi pale honey-yellow; wings yellowish-hyaline, iridescent, nervures and stigma

pale testaceous. Antennæ longer than body, slender; mesothorax trilobed in front; scutellum subconvex; metathorax smooth and rounded; wings ample, areolet small, triangular, petiolated; legs slender, claws pectinate; abdomen smooth and polished; ovipositor as long as abdomen. Length 4–4½ lines.

Cordova; Orizaba.

2. **Phytodietus mexicanus**, n. sp.

♀.—Pale lemon-yellow, opaque; spot covering ocelli, line across occiput from eye to eye, narrow stripe on middle of face, spot beneath eye, base and apex of mandibles, palpi, four basal joints of antennæ, except scape beneath, line on collar, another on prothorax, three broad stripes on mesothorax, base of and medial stripe on scutellum, basal suture of metathorax, a central stripe dilated behind, broad anterior suture of pleura, a zigzag mark on each side, spot or stripe on coxæ behind, trochanters above, a line on femora above, basal two-thirds of first segment of abdomen, basal half of second and third, and narrow basal margins of remaining segments, all black; joints 5–8 of antennæ yellow, the 9th and following joints ferruginous, dusky at tips; wings yellow-hyaline, costa broadly pale fuscous, nervures and stigma honey-yellow; four posterior tibiæ fuscous, with a broad medial yellowish annulus; ovipositor yellowish. Head transversely compressed, face long, broad; clypeus excavated at tip; antennæ as long as body, slender, attenuated at tips; mesothorax trilobed in front; metathorax rounded, finely transversely striated; wings narrow, areolet small, oblique, petiolated; legs slender, tibiæ subspinose, claws pectinate; abdomen subpetiolated, apex subcompressed; ovipositor nearly as long as abdomen. Length 5 lines.

Cordova.

Genus LABENA, Cresson.

Labena gloriosa, n. sp.

♀.—Yellow, smooth, shining; antennæ, except scape, black, brown beneath; mandibles blackish at tips; mesothorax with three brownish stripes; basal suture of metathorax and stain on pleura beneath wings, blackish; wings hyaline, faintly tinged with yellowish, a round, purple-black spot at tip of marginal cell, nervures and stigma black; legs tinged with honey-yellow; basal suture of second and three following segments black, the fifth and remaining tinged with honey-yellow; ovipositor black, sheaths

honey-yellow, brown at tips. Face finely and transversely wrinkled, carinate down the sides and centrally; antennæ two-thirds the length of body, slender, filiform; mesothorax subtrilobed anteriorly; scutellum convex; metathorax with well-defined elevated lines, forming a square central area; abdomen long, gradually thickened toward apex; ovipositor half as long as abdomen, sheaths robust at tips. Length 9 lines.

Mirador. A magnificent insect.

Genus GROTEA, Cresson.

Grotea mexicana, n. sp.

♂ ♀.—Smooth and shining; head and thorax bright yellow; vertex, occiput, mesothorax, and disk of metathorax pale honey-yellow; sutures of pro- and mesothorax black; antennæ honey-yellow, apex yellow, a narrow black annulus on apical third; wings hyaline, iridescent, nervures black; legs and abdomen honey-yellow, the four anterior coxæ and base of first abdominal segment yellow. Length 5½–6½ lines.

Orizaba. (Sumichrast, No. 160.)

DECEMBER 2.

The President, Dr. RUSCHENBERGER, in the chair.

Seventeen members present.

Fertilization of Yucca.—Mr. THOMAS MEEHAN detailed at length the discoveries of Dr. Engelmann and Prof. Riley in regard to the fertilization of the *Yucca* by the aid of a small night moth, *Pronuba yuccasella* of Riley, and observed that in this region the fertilization was effected by this insect every year. In the Rocky Mountains of Colorado in 1871, he saw the *Yucca angustifolia*, everywhere seeding in great abundance; but in his journey in 1873, he saw not a solitary seed-vessel in any of the plants, and he suggested that perhaps some periodical insect might take the place of the *Pronuba* in that country.

Note on a Fungoid Root Parasite.—Mr. THOMAS MEEHAN exhibited a small Norway spruce, in which the branches and leaves were all of a golden tint. He explained that when plants had little food, or lost their fibres in wet soil by which they could not make use of food, the yellow tint was generally exhibited in the leaves of plants. The similarity of the appearances suggesting, he examined and found the roots thickly enveloped by the mycelia of a fungus, which destroyed the young fibres as fast as they were developed. Only a few trees had been attacked two years ago; but last season and this the fungus had spread underground from one plant to another, till now there were over a hundred in the diseased condition of the one exhibited. He had supposed it was one of the small microscopic forms of fungi; but in October of the present year, the mycelia developed into a brown agaric with a pileus about two inches broad, but the exact species of which he could not positively determine. The mycelia of some of the larger fungi would destroy the roots of grasses, as in the well-known case of "fairy rings;" and he believed the *Gardener's Chronicle* had conclusively shown that trees were also injuriously affected by some of them; but he thought that it had not before been so directly proved in the case of American trees.

He suggested, that, as the phenomena in the case of the troublesome disease known to American cultivators as the peach "yellows" were all similar, those who had the opportunity to examine might find the roots affected by a fungus in the same way.

DECEMBER 9.

Mr. VAUX, Vice-President, in the chair.

Twenty-eight members present.

On the Expansion of the Coma in Asclepiadaceæ.—Mr. THOMAS MEEHAN exhibited some seed-vessels of *Gonolobus obliquus*, and remarked, that, though the hairy appendage to the seed known as the *Coma* in asclepiadaceous plants was of course well understood, he knew of no one who had placed on record any observation in regard to the suddenness of the expansion after the seed left the capsule. It was indeed so very rapid, that the common expression of "like a stroke of lightning," was scarcely an exaggeration. It was only with difficulty that the eye could follow the motion. In the seed-vessel each set of long silky hair was drawn up into a close linear fascicle; but on the instant of the seed being relieved from its case, the coma expanded into a perfect hemisphere. Some of the hair formed a right angle, and others more or less acute ones, each seeming to have its fixed place to fall back to.

It was generally supposed that these hairy appendages and others of a similar character in seeds, were for the express purpose of aiding in seed distribution by wind; but he had failed in so many instances to see the advantages, that it often seemed as if it were the seed profiting by developed organs, rather than that these were especially formed for an express purpose. The wings of the linden and maple, for instance, give a peculiar spiral motion to the descent of the seed, without any apparent benefit to the seed from the spiral motion; while the wing, especially in the case of the linden, did not carry the seed far away. But in this case of the *Gonolobus*, it did seem as if there were better grounds than perhaps in any other case for believing that the hairy appendage is designed expressly to facilitate distribution by wind or air currents. The seeds are heavy, and are borne on the plant but a few feet from the ground: they would fall there in a few seconds on the opening of the capsule, if the mass of hair remained long in its closely compact condition. It was indeed absolutely essential, to be of any use at all as an aid to the wind, the expansion should be immensely rapid. He thought it the most perfect illustration of express design he knew in the vegetable kingdom.

On Lingula in a Fish of the Susquehanna.—Prof. LEIDY remarked that Dr. Chapman had submitted to his examination several entozoa, together with portions of the stomach and intestine, of a yellow Pike-perch, *Schizostedion*, or *Lucioperca ameri-*

cana. The fish had been caught in the Susquehanna River, at Duncannon, Pa. In the stomach there was found a large shell of *Lingula pyramidata*, which heretofore had not been discovered inhabiting our coast further north than North Carolina. The yellow Pike-perch was generally considered to be altogether a fresh-water fish. The presence of the lingula in the stomach would indicate that it was at least a visitor to the sea, and in the case of the present fish, probably as far down as the North Carolina coast.

DECEMBER 16.

Dr. CARSON, Vice-President, in the chair.

Twenty-four members present.

Remarks on Fossil Elephant Teeth.—Prof. LEIDY observed that the fossil elephant teeth, presented this evening by Mr. Richard Peters, were obtained by him in Mexico. In appearance the fossils resemble some others, obtained in New Mexico and Chihuahua, referred to in his recent work, "Contributions to the Extinct Vertebrate Fauna of the Western Territories." All appear to have pertained to the coarse-plated variety of molars referred to a species by Dr. Falconer with the name of *Elephas Columbi*. Some of the specimens had been found in association with remains of the Mastodon, the extinct and near relative of the elephant.

The two genera were cotemporaneous, and were represented by many species during the middle and later tertiary periods, but no remains of either have yet been discovered in the early tertiary deposits. It is probable that both are successors from a common stock which existed at a period intermediate to that in which were formed the known eocene and miocene deposits. The elephant has survived the mastodon, as represented in the living species of Asia and Africa to-day. In this country, the comparative abundance and excellent state of preservation of remains of the mastodon in post-tertiary deposits, would apparently indicate that it had survived the elephant. The mastodon had the outward form and the general construction of the living elephant. Like it, it was a bulky, five-toed animal, with a long prehensile proboscis, and with long tusks to the upper jaw.

The molar teeth in the two genera differ in a striking manner, and so widely, that early observers thought those of the mastodon were adapted to a carnivorous habit. The actual number of molars is the same in both, but generally those of the functional series, or those in use at any one time, are more numerous in the mastodon than in the elephant. In this the molars are bulky, laminated masses inserted in the jaws without fangs. In the former the molars have distinct crowns, with prominent transverse lobes, inserted with long, strong fangs.

Notwithstanding the difference it is easy to see that one form is the derivative of the other, and it is probable that the elephantine form was evolved from the mastodont form, as the teeth of the mastodon are of a more ancient pattern or type, that is to say, they accord more nearly with the usual pattern of the molars of ancient pachyderms.

By simple multiplication of the transverse lobes of the molar crowns of the mastodon, contracting these lobes, elongating them so as to encroach on the position of the fangs, and filling the intervals with cementum, we have the elephant molars produced. The miocene stegodons of the Himalayas were elephants with teeth decidedly of intermediate character in these respects, with the true elephants and the mastodons.

This mode of complication of the molar teeth in the evolution of the elephant pattern from the mastodon pattern was a very common one among the ungulates. Most of the early ruminants, as Oreodon, Agriochoerus, etc., and the solipeds, as Anchitherium, had molars with short crowns and prominent lobes, inserted with fangs. Their successors, as exemplified in most living ruminants and the horses, have molars with long crowns, complicated in the same manner as we observe in the elephant as compared with the mastodon.

Nearly all our domestic herbivorous ungulates belong to genera having long-crowned, complicated molars, as exemplified in the elephant, horse, camel, ox, sheep, and goat. The deer retains the more ancient pattern of molars.

That the course of evolution was from the more simple to the more complicated type would appear to be confirmed in the fact that the temporary molars have proportionately shorter crowns and longer roots than in those of the permanent series.

The death of Prof. Agassiz was announced by the Chair, and a committee consisting of Drs. Le Conte, Carson, and Leidy was appointed to draft resolutions of regret.

DECEMBER 23.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-seven members present.

The following paper was presented for publication :—

"On Three New Species of Unionidæ of the United States." By Isaac Lea.

Prof. COPE made some remarks on fishes from the coal measures at Linton, Ohio. He stated that Prof. Newberry, Director of the Geological Survey of Ohio, had sent to him numerous

specimens of fishes and batrachians for determination and description. Among these he had discovered batrachians (*Colosteus*, Cope) which were labelled and had been described as fishes (*Pygopterus scutellatus*, Newb.), and fishes (*Conchiopsis* and *Peplorhina*, Cope) some of which were labelled "Amphibian or Reptilian." Having determined the latter to be fishes and described them, Prof. Cope now called attention to a note of Prof. Newberry on the latter, read at the last meeting of the Academy, in which he states, (1) that *Peplorhina anthracina* is a batrachian; (2) that it is identical with *Conchiopsis exanthematicus*, Cope; (3) that *C. filiferus* is *Coelacanthus elegans*, Newb.; (4) that the dentition described by me is not that of *Coelacanthus*; and that (5) the genus is the same as that described by Agassiz forty years ago as *Coelacanthus*.

To these propositions Prof. Cope replied, that (1) Additional evidence derived from two specimens of *Peplorhina anthracina*, Cope, recently studied, confirms the view that it is a fish, which evidence is given below; (2) That neither of the two specimens exhibits in its cranial bones the characters of *C. exanthematicus*, though both sides are exhibited. They show, however, that the latter should be referred to the genus *Peplorhina*, since among other points they present the same type of teeth, which I find labelled on one of them "ova?"; (3) Prof. Newberry's identification of the species *C. filiferus* with *Coelacanthus elegans* is doubtless correct;[1] but (4 and 5) Its reference (with that of similar species) to Agassiz's genus is not warranted, until it is found to possess an osseous natatory bladder (which Prof. N. states in the Geological Survey of Ohio that he could not find in any of his five hundred specimens), and osseous ribs and the type of dentition are discovered in *Coelacanthus granulatus*, the type of the genus.

One of the new specimens of *Peplorhina*[2] displays the lower side of the cranium, and on it two large jugular bones, one on each side, on the inner side of the mandible. They are elongate, the posterior border oblique, so as to present an apex on the inner side; the inner edge is thin, the outer thickened; the surface smooth, with a very obscure longitudinal striation. Between their anterior extremities is a subround disciform bone in the position of the basi or glosso-hyal. The mandibular rami extend round its anterior margin, and posteriorly nearly to the end of the jugular. The symphysis is a curious interdigitation of three fingers into as many notches, and the dentaries near them are marked with symmetrical pores, which look like the exits of mucous ducts. Three are on the superior, and two on the inferior margin of the bone, and a sixth is immediately between the

[1] Though no one could suppose so from his imperfect figure, Geol. Surv. Ohio, Pl. 40, Fig. 1.

[2] Proceedings of the Academy, 1873, p. 343.

upper and lower inner ones. These pores correspond with the mucous ducts of the lateral line observed in the scales of the type. The teeth are numerously placed in a patch on the vomer, or at least the roof of the mouth, and are short, conic, acute, and smooth. They are discoverable as far backwards as the anterior end of the jugular plates. The large opercular bones are smooth, and the head is covered above with nearly smooth, thin scuta. The head is wide behind, and though contracted forwards, the muzzle is broadly obtuse. Irregular masses, perhaps remains of cartilage, follow the skull in which a few ribs are scattered.

The other specimen displays the smooth operculum patch of vomerine teeth, and several separated scuta of the surface of the cranium. These have rounded angles, one or more convex sides, and very obscure radiating ridges.

The characters relied on as indicative of the reference of *Peplorhina* to the fishes, are (1) the presence of opercula like those of *Conchiopsis;* (2) the presence of jugular bones, and (3) of oval imbricated scales; (4) the absence of ambulatory limbs. The thin scutiform cranial bones, the dense patch of vomerine teeth, and the mucous ducts of the bones and scales were all ichthyic characters. As no limbs had been discovered in three specimens preserved in the appropriate regions, their nature, if existing, could not be determined at present.

Prof. COPE brought before the Academy some results derived from study of material obtained by him during the preceding summer in the miocene formations of Colorado. He announced the discovery of the first fossil monkey of the miocene of America, giving it the name of *Menotherium lemurinum.* He regarded it as allied to the *Tomitherium* of the Bridger Eocene, and as the representative of the more numerous group of the lemuroids, which he had discovered in the latter formation. He stated that there are three tubercular molars and a sectorial-like premolar in front of them ; that this tooth is preceded either by a more elongate premolar with two roots, or by two single-rooted premolars. The molars each support four tubercles in nearly opposite pairs, the inner anterior connected with the outer posterior by a diagonal ridge; the last premolar compressed with obtuse apex, broad heel, and anterior tubercle. Size that of a domestic cat. Prof. Cope stated that his recent discovery of snakes, lizards, and lemurs of forms allied to those previously discovered by Prof. Marsh and himself in the Eocene of Wyoming, constituted points of affinity to the fauna of that period not previously suspected. He also observed that he had discovered some additional species of *Ruminantia* allied to the musk, and to the *Leptomeryx evansii*, Leidy, which he named *Hypisodus minimus*, and *Hypertragulus calcaratus*, and *H. tricostatus.* The first was the least of the order, not exceeding a cat-squirrel in size. *Hyper-*

tragulus differs from *Leptomeryx* in the isolation of the first premolar, as in the camels, and in the sectorial character of the penultimate premolar. The temporary premolars had the form of the pennant corresponding teeth in *Leptomeryx*.

Prof. Cope also mentioned two interesting observations on Ungulate species of the Western Pliocene formation. He found that the horses of the genus *Protohippus* were provided with three toes, as in *Hippotherium*; skeletons of *P. sejunctus*, Cope, and *P. placidus*, Leidy, having furnished the parts in question.

The other fact ascertained was the existence of a complete series of superior incisor teeth in certain camels of the same period. The observation was made on the cranium of an adult *Procamelus heterodontus*, Cope, sp. nov. The alveoli were completely preserved, but it was thought that their appearance indicated the easy shedding of the teeth.

On Circulatory Movement in Vaucheria.—Prof. LEIDY made some remarks on the intra-cellular circulation of plants, as exemplified in the hairs of the Mullein, the leaf-cells of Vallisneria, etc. The moving streams of protoplasm he likened to amœboid movements, and expressed the opinion that they were of the same character. In the common alga, *Vaucheria*, the filaments of which consist of very long cells, comparable to those of Nitella or Chara, he had observed an apparent motion of the cell contents, which is somewhat peculiar and, at least, is not generally mentioned by writers. The wall of the cells is invested on the interior with a layer of tenacious protoplasm, containing the thinner liquid cell contents as usual. The parietal protoplasm is closely paved with green granules, and these appear very slowly but incessantly to change their position in relation with one another. The motion is so slow that it was a question for some time whether it did actually occur, but it appears sufficiently obvious if observed in relation with the lines of a micrometer, and its existence was confirmed by several friends whose attention was directed to it.

In behalf of the committee, Prof. CARSON made the following report:—

In accordance with the resolutions passed at the last meeting of the Academy, upon the announcement by the chairman of the death of Prof. Agassiz, that a committee be appointed to prepare such a testimonial as would express the sentiment of the Academy upon the loss of so distinguished a member, and be proper to be placed upon the minutes as a record of the high appreciation entertained by it of his services to science, the committee reports the following:—

Resolved, That in the death of Professor Louis John Rudolph Agassiz the Academy of Natural Sciences of Philadelphia has lost one of the most illustrious of the associates whose names have graced the list of members of the institution.

Resolved, That the Academy fully recognizes the fact that by the death of one whose works and reputation shed lustre upon the pursuit of natural science, not only this country, but the intellectual world, has sustained a loss which will not easily be replaced.

Resolved, That, with the grief we would express for his loss as one of the most eminent of modern naturalists, we cannot withhold the attestation of our gratitude for the course he took of becoming a citizen of the United States, and for his untiring devotion to the development of the natural history of this continent, thus having identified himself with American science, of which he was a leading and most successful explorer.

Resolved, That while his life and career were models to be imitated by the student of nature, his genial temper, estimable qualities and high honorable motives as a man endeared him to all who came within his influence, and have left the most pleasurable recollections of his person and character.

Resolved, That we deeply sympathize with those in whose immediate behalf and for whose advancement his talents and energy have been expended, and express the hope that the impulse he has given to their labors may be continued, and that the interest he aroused within the immediate circle of his efforts may not be lost, but continue as a tribute to his worth and the perpetuation of his fame.

Resolved, That we fully appreciate the extent of the bereavement which, under Providence, has befallen the family and friends of Prof. Agassiz, and beg to express our heartfelt participation in the sorrow experienced by them.

The resolutions were adopted unanimously, and the President of the Society was instructed to transmit a copy of them to the widow of Prof. Agassiz.

DECEMBER 30.

The President, Dr. RUSCHENBERGER, in the chair.

Forty-one members present.

The following paper was presented for publication: "Remarkable Variations in Coloration, Ornamentation, etc., of certain Larvæ of Nocturnal Lepidoptera." By Thos. G. Gentry.

The following were elected members: John Welsh, Jr., Thos. H. Powers, Jas. M. Fox, Daniel Neall, Frank D. Lankenau, Wm. L. Schaffer, Samuel L. Smedley, Mrs. S. R. Barton.

Prof. Burt G. Wilder, of Ithaca, N. Y., Prof. J. Henle, of Göttingen, and Townshend S. Brandegee, of Cañon City, Colorado, were elected correspondents.

On report of the committees, the following papers were ordered to be printed:—

DESCRIPTION OF SEVEN NEW SPECIES OF UNIONIDÆ OF THE UNITED STATES.

BY ISAAC LEA.

Unio infulgens.

Testa lævi, suboblonga, inflata, inæquilaterali, postice subbiangulari, antice rotundata; valvulis crassis, antice crassioribus; natibus prominulis; epidermide nitida, polita, eradiata; dentibus cardinalibus subgrandibus, sulcatis et in utroque valvulo duplicibus; lateralibus longis, crassis subrectisque; margarita salmonis colore tincta et valde iridescente.

Hab. Stewart's Pond, Union Co., N. Car. C. M. Wheatley.

Unio subolivaceus.

Testa lævi, oblonga, subcompressa, inæquilaterali, postice obtuse angulari, antice rotundata; valvulis crassis, antice crassioribus; natibus prominulis; epidermide luteo olivacea, subnitida, eradiata; dentibus cardinalibus grandis, sulcatis, in utroque valvulo duplicibus; lateralibus percrassis, obliquis; margarita alba et iridescente.

Hab. Catawba River, Fox and Yadkin Rivers, N. Car. C. M. Wheatley.

Unio cirratus.

Testa lævi, oblonga, subcompressa, inæquilaterali, postice obtuse biangulari, antice rotunda; valvulis subcrassis, antice parum crassioribus; natibus prominulis; epidermide tenebroso-fusca, subcirrata, eradiata; dentibus cardinalibus parviusculis, sulcatis, in utroque valvulo duplicibus; laterabus sublongis, lamellatis subrectisque; margarita vel alba vel salmonis colore tincta et valde iridescente.

Hab. Abbeville Dist., S. C. Dr. Barratt.

Unio subcylindraceus.

Testa lævi, subcylindracea, valde transversa, valde inæquilaterali, postice obtuse biangulari, antice oblique rotundata; valvulis crassis, antice parum crassioribus; natibus prominulis; epidermide luteo-viridi, perradiata; dentibus cardinalibus parviusculis, compresso-conicis crenulatisque; lateralibus prælongis, lamellatis

subrectisque; margarita vel alba vel purpurea vel salmonis colore tincta et valde iridescente.

Hab. Rocky Creek, near Macon, Geo., J. C. Plant; and Carter's Creek, Geo., J. Postell.

Unio hastatus.

Testa lævi, transversa, subcompressa, valde inæquilaterali, postice angulata, antice rotunda; valvulis crassiusculis, antice parum crassioribus; natibus prominulis, epidermide luteo-oliva, obsolete radiata; dentibus cardinalibus parvis, subcompressis crenulatisque; lateralibus longis, lamellatis subrectisque; margarita alba et valde iridescente.

Hab. New Market, Abbeville Dist., S. C., Dr. L. R. Gibbs and Dr. Barratt; and Rocky Creek, near Macon, Geo., J. C. Plant.

Unio corneus.

Testa lævi, oblonga, subcompressa, ad latere parum planulata, inæquilaterali, postice biangulari, antice rotundata; valvulis crassiusculis; natibus prominulis; epidermide cornea, perradiata; dentibus cardinalibus crassiusculis et in utroque valvulo duplicibus; lateralibus longis, crassis subcurvisque; margarita pallido-purpurea vel salmonis colore tincta et iridescente.

Hab. Columbus, Geo., G. Hallenbeck; Abbeville Dist., S. C., Dr. Barratt; Marietta, Geo., J. C. Anthony.

Unio strumosus.

Testa lævi, rotundata, inflata, inæquilaterali, postice obtuse undulata, antice rotundata; valvulis crassis; natibus prominulis; epidermide tenebroso-fusca vel nigra, eradiata; dentibus cardinalibus subgrandibus, rugosis, in utroque valvulo duplicibus; lateralibus longis, rugosis curvatisque; margarita alba et iridescente.

Hab. Yadkin River, N. C. C. M. Wheatley.

DESCRIPTION OF THREE NEW SPECIES OF UNIONES OF THE UNITED STATES.

BY ISAAC LEA.

Unio Dooleyensis.

Testa lævi, oblonga, valde compressa, valde inæquilaterali, postice biangulari, antice rotundata; valvulis subtenuibus; natibus prominulis; epidermide luteo-oliva, obsolete radiata; dentibus cardinatibus parvis, in utroque valvulo duplicibus; lateralibus longis, lamellatis rectisque; margarita livida et iridescente.

Hab. Dooley Co., Georgia, Rev. G. White; Abbeville, S. C., Dr. Barratt.

Unio invenustus.

Testa lævi, oblongà, subcompressa, valde inæquilaterali, postice subbiangulari, antice rotundata; valvulis crassiusculis, antice aliquanto crassioribus; natibus prominulis; epidermide tenebroso-fusca, obsolete radiata; dentibus cardinalibus parviusculis sulcatisque; lateralibus sublongis, curvatis lamellatisque; margarita livida et iridescente.

Hab. Columbus, Geo., G. Hallenbeck; Russel Co., Geo., Dr. Neisler; Irwin's Creek, North Carolina, C. M. Wheatley.

Unio Gesnerii.

Testa lævi, suboblonga, inflata, inæquilaterali, postice subbiangulari, antice oblique rotundata; valvulis subcrassis, antice crassioribus; natibus prominulis; epidermide tenebroso-fusca vel radiata vel eradiata; dentibus cardinalibus crassiusculis, in utroque valvulo duplicibus sulcatisque; lateralibus longis, crassis lamellatisque; margarita livida et iridescente.

Hab. Uchee River, near Columbus, Geo. Dr. J. Lewis.

NOTES ON THE GENUS CONCHIOPSIS, Cope.

BY J. S. NEWBERY.

In the Proceedings of the Academy of Natural Sciences (1873, Part II. page 340), I find descriptions by Prof. Cope of some fossil fishes from the Coal Measures of Ohio, which seem to require a word of comment. A large collection of amphibian remains which I obtained from Ohio, I sent to Prof. Cope for description, informing him that the fossil fishes found with them had been, or would be, described by myself. Among the amphibian remains sent to Prof. Cope a few fishes were accidentally included. These he has described in the place referred to. To receive them he has constructed the new genus *Conchiopsis*, Cope, and describes under it three species; *C. filiferus*, Cope; *C. anguliferus*, Cope, and *C. exanthematicus*, Cope. He also describes another genus, *Peplorhina*, of which he defines one species (*P. anthracina*, Cope). Since these descriptions were published, the specimens have been returned to me. On examining them, I find—

1st. That Prof. Cope's genus *Conchiopsis* is identical with Agassiz's *Cœlacanthus*, described in his *Poissons Fossiles*, Tom. II., Par. 2, page 170. The genus is still further and more fully illustrated by Huxley in *The Memoirs of the Geological Survey of the United Kingdom, Decades X and XII.*

2d. Prof. Cope's species *C. filiferus* and *C. anguliferus*, both belong to the species *Cœlacanthus elegans*, described by me in the *Proceedings of the Acad. of Nat. Sciences*, Philadelphia, April, 1856, and more fully illustrated in the first volume of the final report of the *Geological Survey of Ohio*, Part II., Palæontology, page 337, pl. 40.

3d. The "gular plates" referred to by Prof. Cope in his description of *Conchiopsis*, are really the *opercula;* the jugular plates —which he has apparently not seen—are long—elliptical, sometimes almost linear in outline.

4th. The dentition which Prof. Cope attributes to *Cœlacanthus* (*Conchiopsis*, Cope) is not the true dentition of the genus, as he has drawn his inference from the dentition of his *C. exanthematicus*, which is not a *Cœlacanthus.*

5th. The species referred to above, *Conchiopsis exanthematicus*,

Cope, is identical with his *Peplorhina anthracina*. The chief distinction made by him: the difference in the surfaces of what he calls the "gular shields"—in one case smooth, in the other granulated or pustular—is due simply to the exposure, in one case, of the inside, and the other, the external and ornamented surface of the cheek plates as they are, and not jugulars as he considers them.

6th. The material representing Prof. Cope's genus *Peplorhina* is too imperfect for satisfactory study, but, in my judgment, it represents an amphibian and not a fish.

I ought, perhaps, to say in justification of the somewhat positive manner in which the above statements are made, that they are based upon a careful study of an immense amount of material which I have been gathering from Linton during the last twenty years. The richness of this material may be inferred when I say that of the species especially referred to in the above note, *Cœlacanthus elegans*, I have obtained more than 500 specimens.

The following reports were read and referred to the Publication Committee:—

RECORDING SECRETARY'S REPORT.

The Recording Secretary respectfully reports that during the year ending November 30th, 1873, there have been elected forty-three members and nine correspondents.

The announcement has been made of the death of the following members and correspondents:—

Seven members, namely: Samuel Emlen Randolph, Com. John P. Gillis, U.S.N., Dr. Thomas McCuen, John Warner, Elias Durand, Dr. L. S. Bolles, Theodore Moss.

Three correspondents, namely: Dr. John Torrey, Friedrich Ernest Melsheimer, M.D., Frank Guckert.

Two resignations of membership have been accepted.

The number of papers contributed and ordered to be printed in the Proceedings and Journal of the Academy during the year, has been twenty-eight, as follows:—

In the Journal:—

Isaac Lea	1	E. D. Cope	1

For the Proceedings:—

Isaac Lea	1	G. R. Crotch	2
C. T. Cresson	3	E. D. Cope	3
R. E. C. Stearns	1	Theo. Gill	3
Dr. John L. Le Conte	2	T. G. Gentry	5
Bernard A. Hoopes	1	Cyrus Thomas	1
W. H. Dall	1	Andrew Garrett	3

Thomas Bland and W. G. Binney 1

Papers ordered to be published in the Medical Journals, two, namely:—

Dr. Tyson	1	Drs. A. Fricke and Joseph Leidy	1

All of which is respectfully submitted,

SAMUEL B. HOWELL,
Recording Secretary.

THE LIBRARIAN'S REPORT.

The Librarian respectfully reports that 1336 additions to the library have been made during the year 1873.

Of these 299 were volumes, 1031 pamphlets and parts of periodicals, and 6 maps and charts, etc.; 1052 were octavos, 241 quartos, 22 duodecimos, 15 folios, and 6 maps.

They were derived from the following sources:—

Societies	605	Daniel B. Smith	2
Editors	252	A. J. Brasier	2
Authors	160	Minister of Public Works in France	2
The late Elias Durand	58	Department of the Interior	2
The Wilson Fund	51	Rev. E. R. Beadle	1
Isaac Lea	18	H. Erni	1
Thomas Meehan	8	Government of Bengal	1
Publishers	8	S. S. Haldeman	1
Geological Survey of Sweden	8	Dr. J. H. McQuillen	1
Geological Survey of Italy	6	W. E. Bowman	1
Geological Survey of India	4	Government of Brazil	1
Mrs. Griffith	6	E. Rosengarten	1
Treasury Department	5	Francis A. Walker	1
Agricultural Department	5	Dr. H. C. Wood	1
J. S. Newberry	3		
Commissioner of Education	3		

One hundred and eighteen were purchased. The 58 volumes from the late Elias Durand, including a collection of valuable pamphlets in six volumes, were bequeathed to the Academy: his wish was that they should be kept in the Botanical Room, for the convenience of those working in the Herbarium; and in compliance with this intention a separate catalogue of these books has been prepared.

The additions to the library were distributed to the several departments as follows:—

Journals and Periodicals	859	Useful Arts	10
Geology	99	Physical Science	6
Botany	79	Chemistry	6
Bibliography	68	Herpetology	4
General Natural History	46	Ichthyology	4
Conchology	34	Mineralogy	4
Entomology	32	Voyages and Travels	3
Anatomy and Physiology	26	Antiquities and Fine Arts	2
Theology	26	Mathematics	2
Ornithology	15	Mammalogy	1
Helminthology	10		

307 volumes have been bound.

The catalogues of the works on Geology, Entomology, and General Natural History have been carefully revised, and the entries in the first named, numbering 1902 titles exclusive of cross-references, have been arranged in alphabetical order, ready for transcribing. 538 Geological pamphlets have been indexed and bound in 31 volumes; and 164 pamphlets on General Natural History have been arranged in 12 volumes.

In the department of Journals and Periodicals the cases and shelves have been numbered, and the position of each work indicated on a new catalogue, which has been completed and is herewith presented. The numbers are merely provisional, as the amount of shelf room in this section of the library is entirely too small to permit of a proper display of the volumes. Whilst the old arrangement in this department has not been altered, it is yet hoped that the reference to the case and shelf will facilitate the finding of Journals, which, in the mere geographical classification, might readily be overlooked. The entries in this catalogue number 763.

The library has been kept open in the evenings until 10 o'clock since the 2d of last April. The attendance of members has been small, but the additional time at the disposal of the librarian has given him an opportunity of finishing much of the work above reported, the greater part of which would be still incomplete had his attendance been confined to the morning hours, as formerly.

All of which is respectfully submitted,

EDWARD J. NOLAN, *Librarian.*

REPORT OF THE CURATORS.

But little change has been made in the Museum of the Academy towards the arrangement in general of its collections since the presentation of the last annual report. Under the voluntary and assiduous labor of the committee of arrangement of the Conchological Section, the conchological cabinet has been completely arranged and labelled, and may now be regarded as in better condition than any other collection of the Museum. For a special account of that cabinet, and the additions made to it during the year, we refer to the Report of the Conservator of the Conchological Section.

The Curators regret to state that several of the collections of

the Museum have recently suffered from the depredations of a thief, but are also pleased to add that the latter has been apprehended, and it is believed that all the stolen articles have been recovered.

The contributions towards the Museum during the year are as follows:—

Mammals.—A Porpoise, from the Delaware River, was presented by Dr. H. C. Chapman. An Ant-eater, a Sloth, an Opossum, and a Howling Monkey, from Guinea, were presented by Capt. R. S. Henwood; and three monkeys from the same country were presented by Mr. Frank Guckert. As a donation from the Smithsonian Institution we received a collection of American Muridæ, consisting of a box of skins and two jars of specimens in alcohol. Mr. Nathaniel H. Bishop presented two specimens, male and female, of *Spermophilus Franklinii*, caught in Ocean Co., New Jersey; and Dr. L. Fussel presented a Black Rat, *Mus rattus*, caught near Philadelphia.

Birds.—Five skins of Toucans, from Guinea, were presented by Mr. F. Guckert. Specimens of a recently described variety of *Buteo borealis*, called Krider's Hawk, male and female, were presented by Mr. John Krider. The nest of the common Humming-bird, was presented by Col. F. M. Etting.

Reptiles, Batrachians, and Fishes.—A collection of reptiles and fishes, contained in 21 jars, from the Viti Isles, was presented by Andrew J. Garrett. Another collection, in 12 jars, from Wyoming, was presented by Prof. E. D. Cope. Others were presented as follows: A collection of reptiles, in 6 jars, from Venezuela, by L. M. Davis; the skin of a large serpent, two other snakes and a lizard, from Guinea, by F. Guckert; 3 jars of fishes, from Wyoming, by Dr. Leidy; 2 fishes and a snake, from Peru, by Thomas M. Cleemann; an Amblystoma, from Utah, by Dr. H. C. Chapman; and a Grayling, from Michigan, by Mr. Thaddeus Norris.

Osteological Specimens.—Skeletons of a Capybara, a Kangaroo, a Fisher, a Pine Martin, an American Badger, and a Black Spider Monkey were purchased for the Museum. Nine skeletons of birds, from St. Paul's Island, Alaska, from the Elliot collection, were donated by the Smithsonian Institution. Skulls of a Crocodile and a Tapir, and the hyoid of a Howler, from Guiana, were presented by F. Guckert. A fine large skull of the Rocky Mountain

Sheep was presented by Joseph Jeanes and Isaac Lea. There were also donated two skulls of Mound-builders, from Ohio, by Messrs. Walter Brown and Cyrus B. Haldeman, and the skull of a Samoan Islander, by Dr. H. C. Eckstein, U. S. N.

Mollusks.—See Report of the Conservator of the Conchological Section.

Articulates and Radiates.—A collection comprising many corals and echinoderms, from the South Pacific, was presented by Dr. H. C. Eckstein. A collection of crustaceans and a coral, from the Viti Isles, were presented by A. J. Garrett. Two species of centipeds and a spider were presented by Mrs. Williams; several scolopendræ and beetles, from Guiana, by F. Guckert; and a Gorgonia, by Mr. Neville.

Fossils.—A collection of well-preserved remains of Uintatherium and bituminous shales with fishes and shells, from the tertiary formations of Wyoming, were presented by Joseph Jeanes and Isaac Lea. Numerous remains of Palæosyops, Hyrachyus, Uintatherium, Emys, Testudo, Trionyx, etc., obtained from the tertiary beds in the vicinity of Fort Bridger, Wyoming, were collected, on account of the Academy, during the last summer, by Dr. J. Van A. Carter and Dr. Leidy, part of the expense of the expedition having been defrayed by Joseph Jeanes and Isaac Lea.

Small collections of fossils were presented as follows: Some vertebrate remains from the Ashley River phosphate beds, by Thomas Sinnickson; some palæozoic fossils, from Madison, Indiana, by M. A. Gavitt; miscellaneous fossils, by C. S. Bement; Mosasauroid remains, from the Santee Agency, by Dr. George Roberts; several fossils from New South Wales, by Dr. H. C. Eckstein and Mr. P. F. Adams; some shark teeth, from Mt. Holly, N. J., by Dr. Francis Ashhurst; teeth of the elephant, from New Mexico, by Mr. Richard Peters, and several shells, from Virginia, by S. Powel.

Plants.—A collection from the Dall Exploring Expedition in Alaska, and another of Malaccan plants, from Kew Garden, Eng., were presented by Prof. Asa Gray. One hundred species of plants of Utah, collected by A. L. Siler, were presented by Thomas Meehan. Specimens of the mistletoe of *Pinus ponderosa* of Colorado were presented by Prof. Cope.

Minerals.—Many choice specimens, all appropriate for the cabinet, were presented, as follows: Sixty-one from Clarence S.

Bement; forty-one from Joseph Jeanes; fifteen from Wm. S. Vaux; three from Messrs. Vaux and Bement; twenty from Joseph Willcox; two by Homer Pennock; eight by Dr. H. C. Eckstein, U. S. N.; two by Dr. F. V. Hayden; two by Dr. J. Van A. Carter; six by John R. Harvey; one by Thomas Sinnickson; and one by Dr. Leidy.

A remarkably fine specimen of opalized wood, consisting of the segment of a tree, about one foot in length and eight inches in diameter, was presented by Mr. Michael Mohler, of Nevada City, California. A mass of galena, weighing upwards of 600 lbs., was presented by the Asbury M. E. Sunday School of Dubuque Co., Iowa.

Other minerals were presented by Messrs. P. P. Peck, P. F. Adams, G. C. Hewett, and Charles Weston.

Miscellaneous Specimens.—A curious stone relic, from Butler Co., Pa., was presented by Dr. J. C. McKee, U. S. A. A jar containing a collection of small vertebrates and some invertebrates, from the Isle Redowda, W. I., was presented by Dr. R. E. Van Riggersma. Several interesting objects were donated by Mr. T. G. Gentry; and a large Hornet nest, from New Jersey, was received from John Tatem.

Respectfully submitted by

JOSEPH LEIDY,
Chairman of Curators.

REPORT OF RECORDER OF BIOLOGICAL AND MICROSCOPICAL SECTION.

Adopted December 1st, 1873, and forwarded to the Academy of Natural Sciences as the Report of the Section for the current year.

In presenting our Annual Report for the year 1873, I think we have again great reason to congratulate ourselves upon the amount of original observation and experiments which has been brought forward by our members, placed on record in our proceedings, and given to the world, chiefly in the columns of the *Philadelphia Medical Times*. For whilst it is true that a smaller number of elaborately prepared essays have been laid before us the past twelve months than in former years, there has, undoubtedly, been elicited in our discussions a much larger amount and variety of that individual opinion and experience which form the essential

objects of any such society for the systematic observation of natural phenomena as ours, and the expression of which constitutes the true life of every similar association.

The interesting report of Dr. Albert Fricke upon the "Horse Epidemic of October and November, 1872," read before our December meeting of last year, and published in the *Medical Times*, was followed in January by the useful essay of Dr. J. Gibbons Hunt, "On the Preparation and Preservation of Vegetable Tissues," comprising a complete exposition of the method for mounting objects in Damar, which has of late proved so valuable to microscopists. In connection with this communication, Dr. Hunt showed specimens of the common Truffle, discovered growing wild near Philadelphia by himself, for the first time, as far as we are aware, in America.

The February meeting was occupied with the reading and discussion of Dr. James Tyson's able paper, "On the Microscopic Study of Blood and Epithelium," embodying some of the results of the author's observations in Europe, in the laboratories of Stricker and Klein, and since developed, in accordance with nature's great law of the survival of the fittest, into an excellent introduction to practical histology.

Mr. Danl. S. Holman submitted to us in March his ingenious moist slide for the examination of blood, pus, etc., whose practical application was admirably shown the following month, at the very satifactory exhibition of microscopes, microscopical apparatus, and specimens, given by the Section in the Hall of the Academy, and attended by a large number of members and citizens, including many ladies, who appeared much interested in the wonders of the microscopic world.

In May, Dr. J. G Hunt contributed a very practical communication, "On the Use of Hæmatoxylon in the Preparation of Stainings of both Vegetable and Animal Tissues," and in June exhibited a common Stellate Hair, sent to him as an extraordinary ingredient of vomited matter, which gave rise to an interesting and important debate upon Dr. Charlton Bastian's researches in regard to the Beginnings of Life.

The curious putridity of the water in the reservoir at the Camden Water Works, which presented an insoluble problem to various scientists, was demonstrated during the summer, by Dr. J. G. Hunt, to be due to the growth of a Nostoc, the Trichormus

Thompsoni, and at the October meeting he exhibited specimens of the plant, and suggested a method of preventing its development, which, if adopted, may economize expenditure to the amount of thousands of dollars, for our own and other municipal authorities.

Finally, at our last meeting, several short communications were brought forward, among the most important of which were Dr. Tyson's exhibition and account of Echinococci, and Dr. J. H. McQuillen's observations on a remarkable case of Dilaceration of the Crown of an Incisor Tooth.

All of which is respectfully submitted,

Jos. G. Richardson, *Recorder.*

REPORT OF CONSERVATOR OF CONCHOLOGICAL SECTION.

The Conservator of the Conchological Section respectfully reports that the donations to the Cabinet, during the past year, have been as follows:—

Beadle, Rev. E. R. *Nannina rareguttata*, Mous., from Insula Adenon and *Ariopanta intumescens*, Blandf., from Mahlablishvar, India.

Berendt Expedition, Subscribers to. Five species of land and fresh-water shells from Central America.

Ennis, J. *Pecten tenuicostata*, Migh., from Mt. Desert Island, Maine.

Lea, I. Eight species of *Unio*, and two species from Georgia and S. Carolina.

In addition the following have been presented to the Academy:—

Dall, W. H. Types of three new species of *Mollusca* from California.

Eckstein, Dr. H. C. One hundred and twenty-eight species of shells from the South Pacific Islands.

Gabb, W. M. Fifty-two species of land shells from San Domingo.

Garrett, And. Twenty-six species of *Cypræa*, from the Viti Islands. Forty species of *Neritidæ* and *Neretinidæ*, from the Viti Islands. Seven hundred and twenty-five species of Marine and Terrestrial Mollusca principally from the Viti Islands,

Central Pacific Ocean. In all, about three thousand specimens, including types of many new species.

LEA, I. *Unio incrassatus*, Lea, Georgia; and *Unio Forbesianus*, Lea, Abbeville Dist., S. C.

RUSCHENBERGER, Dr. W. S. W. Three species of Marine Mollusks from Porto Venere, Spezzia, and three species of *Helices* from Pompeii.

STEARNS, R. E. C. Fifty species Marine Mollusca, from Coast of California, principally new to the Academy's collection. Also types of several new species from Florida, to be described in the Academy's Proceedings.

WETHERBY, A. G. *Helix fallax*, Say, and *Goniobasis sordida*, Lea, Pearson's Creek, Mo.

WILLCOX, Jos. *Helix albolabris*, S. W. North Carolina.

The work of the Committee on the arrangement of the Cabinet has been prosecuted during the year with extraordinary industry, and it affords your Conservator lively satisfaction to be able to report the conclusion of the Committee's labors, and the complete arrangement of the collection of shells. At the end of 1872, 40,873 specimens of 6893 species had been supplied with 12,067 labels, and placed systematically in the cases. During the past year 35,606 specimens of 7268 species have been cleansed, oiled, and arranged in trays, and 12,218 labels written, thus showing a larger amount of work done in this one year than had been completed in the six preceding years. The collection is, probably, in every respect the finest in the world, and represents nearly all the good species described; a very large synonymy—amounting to, perhaps, several thousand names—being eliminated during the progress of arrangement. Many of the families and genera are very complete. Among those arranged this year, the Unionidæ may be mentioned, consisting of 783 species and 3592 specimens contained in 1555 trays.

Dr. Hassler has continued to arrange the duplicate specimens for sale, and reports the total number of lots placed in the hands of Mr. Kline to December 4, to be 4936, valued at $796. The total amount received from sales is $171. This, together with sundry contributions from members, has been used in procuring 144 drawers, which have been placed under the horizontal cases to permit of the extended arrangement of the collection.

About 863 species have been sent to Chicago to assist in replacing the collection of the Chicago Academy of Sciences, lately destroyed by fire, and upwards of 100 additional species are now ready for transmission. These have all been correctly determined and named.

In thus announcing the completion of the labor of seven years, this report would not be complete if special mention were not made of the gentlemen who have devoted so much of their time and skill to the work. A bare statement of the fact that every one of the 14,161 species contained in the collection has been separately and carefully examined by Mr. Tryon, that he has determined nearly all the species not hitherto named, and verified the names already given, will be sufficient to show how much the Academy is indebted to him for his unflagging industry. To the taste and skill of Mr. Parker, who has thus employed most of the time not occupied by other duties, is mainly due the admirable manner in which the specimens are so arranged as to exhibit the specific characters without the necessity of handling. Mr. Roberts has also devoted much of his leisure time to the same work, while the report of what has been done by Dr. Hassler in the disposition of the duplicates, bears ample testimony to his industry.

It is already well known to the members of the Society that this labor has been entirely voluntary. It has been, in truth, a labor of love, and the elegance of the arrangement, no less than the comparative completeness of the collection, is sufficient evidence of the earnestness with which all concerned have fulfilled their self-imposed task.

All of which is respectfully submitted,

EDW. J. NOLAN, *Conservator.*

The election of Officers for the year 1874 was held in accordance with the By-Laws, with the following result:—

President . . .	W. S. W. Ruschenberger, M.D.
Vice-President . .	Wm. S. Vaux, Jos. Carson, M.D.
Recording Secretary .	Samuel B. Howell, M.D.
Corresponding Secretary	Edw. D. Cope.
Librarian . . .	Edw. J. Nolan, M.D.

Treasurer . . .	Wm. C. Henszey.
Curators . . .	Jos. Leidy, M D., Wm. S. Vaux, Geo. W. Tryon, Jr., Chas. F. Parker.
Publication Committee .	Jos. Leidy, M.D., Wm. S. Vaux, Geo. W. Tryon, Jr., Edw. J. Nolan, M.D., W. S. W. Ruschenberger, M.D.
Council	Robt. Bridges, M.D., Edw. S. Whelen, J. L. LeConte, M.D., R. S. Kenderdine, M.D.
Finance Committee . .	A. H. Smith, Wm. S. Vaux, Robert Bridges, M.D.

ELECTIONS FOR 1873.

The following are the names of Members and Correspondents of the Academy of Natural Sciences elected during the year 1873.

MEMBERS.

January 7.—Dr. Chas. A. Siegfried, Rich. H. Townsend, M.D., Mrs. Caroline Pennock, Charles Macalester, Wm. B. Bement, Wm. Logan Fox.

January 28.—Thomas I. Yorke, Jr., Chas. Sinnickson, Howard N. Potts, Dr. John J. Sinnickson, Armon D. Trimble.

February 25.—Alfred Moore, John M. Hartman, Harry F. Baxter, M.D.

April 1.—Lewis Haehnlen, Nathaniel E. Janney, Peter C. Erben, Richard Peterson, Mrs. Levi Morris.

April 29.—John J. Macfarlane, Kingston G. Goddard, M.D., Augustus R. Hall.

May 27.—Dr. Thomas N. Penrose, U. S. N., C. Tower, Edward Wright, William Massey, Rev. Charles E. Betticher.

June 24.—C. Eugene Claghorn, Dr. William H. Rush, Dr. Henry C. Eckstein, U. S. N.

September 30.—William F. Biddle, Joseph Neuman, Apollos W. Harrison, Rev. J. B. Howell, Dr. L. S. Clark, Mrs. Louisa J. Roberts, C. J. Hoffman, Andrew Macfarlane, A.M., De Forrest Willard, M.D.

October 28.—Dr. George T. Barker, Jos. C. Wright.

November 25.—Dr. T. R. Wolf.

December 30.—Frank D. Lankenau, Wm. L. Schaffer, Samuel L. edley, Mrs. S. R. Barton, Joseph M. Fox, John Welsh, Jr., os. H. Powers, Daniel Neall.

CORRESPONDENTS.

January 7.—Jabez Hogg, F.L.S.

April 1.—Dr. J. Dalton Hooker, of Kew, England; Andrew Garrett, of Huaheine, Society Islands.

May 27.—Dr. Thos. R. Frazer, of Edinburgh; Dr. Wm. H. Jones, U. S. N.

September 30.—Frank Guckert, of Ciudad Bolivar, Venezuela.

October 28.—Chas V. Riley, of St. Louis, Mo.

December 30.—Townshend S. Brandegee, of Cañon City, Colorado; Prof. J. E. Planchon, of Montpellier, France; Prof. Burt G. Wilder, of Ithaca, N. Y.; Dr. J. Henle, of Göttingen.

CORRESPONDENCE OF THE ACADEMY.

For 1873.

January.—J. W. Powell, acknowledging receipt of notice of election as correspondent.

Library of the State University of N. Y.;

Académie Royale des Sciences à Amsterdam;

Bureau de la Recherche Geologique de la Suede, Stockholm; severally acknowledging receipt of publications.

Bureau of Education, Washington, soliciting statistics and acknowledging receipt of pamphlets and letter.

Belfast Naturalists' Field Club, soliciting an exchange of publications.

F. H. Grubb, proposal to collect specimens.

J. F. Mann, offer of brook trout spawn.

M. C. Griffis, soliciting a catalogue of members.

Naturwissenchaftlicher Verein, Hamburg.

R. W. Corwin, soliciting employment as taxidermist.

February.—C. M. Scammon, acknowledging receipt of notice of election as correspondent.

F. M. Elling, with nest of humming bird.

Smithsonian Institution, Washington, D. C.;

Die Naturforschende Gesellschaft in Zürich; severally acknowledging receipt of publications.

A. L. Rawson, offer of specimens.

Smithsonian Institution, accompanying specimens and soliciting exchange.

Maryland Academy of Sciences, papers relating to the establishment of the society.

Gesellschaft zur Beforderung der Gesammten Naturwissenschaften in Marburg.

March.—Liverpool Public Library, with catalogue of books.

A. L. Wangaman, soliciting catalogue of Academy, with constitution and by-laws, etc.

Asiatic Society, Calcutta, requesting our publications.

Die Naturforschende Gesellschaft in Danzig.

Nassauische Verein für Naturkunde, Wiesbaden.

Société Entomologique de Russie, St. Petersburg.

Académie Royale Suédoise des Sciences, Stockholm.

Société d'Agriculture de Lyon.
Koeniglich Bayerische Akademie der Wissenchaften, München.

April.—Lyceum of Natural History, N. Y.;
Der Naturforschende Gesellschaft, Basel, Switzerland;
Royal Society of London; severally acknowledging receipt of publications.
Scientific, Classical, and Commercial Academy, notice of visit.
American Association for the Advancement of Science, Portland, Me., abstracts of official documents.
E. Riviere.
Société Paleontologique Suisse.
Verein für die Erdkunde zu Darmstadt.
Naturwissenschaftliche Verein für das Fürstenthum Lüneburg.
Kaiserliche Universitäts Bibliothek, Strassburg.
Naturwissenschaftliche Gesellschaft zu Chemnitz.
Gesselschaft für Naturgeschichte in Mecklenburg.
Die Oberhessische Gesellschaft für Natur und Heilkunde, Giessen.
Physicalisch-medicinische Gesellschaft in Würzburg.
Staatsbibliothek in München.
Naturwissenschaftl. Verein zu Bremen.
Innspruck K. K. Universitäts Bibliothek.
Das Bibliothekariat der Acadé.nie der München.
Gesellschaft für Naturkunde in Wurtemburg.
Académie des Sciences et des Arts de Dijon.

May.—Zoological Society of London;
Boston Society of Natural History;
Lyceum of Natural History, N. Y.;
Smithsonian Institution;
Yale College; severally acknowledging receipt of publications.
Minnesota Academy of Natural Sciences, Minneapolis, with constitution, by-laws, etc.
Colonial Museum, New Zealand, soliciting an exchange of publications.
Smithsonian Institution, with specimens of mammalia in skins and alcohol.
Geo. W. C. Miller.
Die Naturforschende Gesellschaft in Bern.
Société de Physique et d'Histoire Naturelle de Genève.
Die Königlich Sächsische Gesellschaft in Leipzig.

June.—Essex Institute, Salem;
Smithsonian Institution, Washington, D. C.;
American Geographical Society, N. Y.; severally ackowledging receipt of publications.
J. Cummiskey, with resignation as a member.
Naturforschende Gesellschaft in Emden.

Academia Gioenia di Scienze Naturali in Catania.
Verein für Geographie ü. Statistik zü Frankfurt.
Académie Royale des Sciences de Lisbonne.
Die physikalisch-medicinische Societät in Erlangen.
Kaiserliche Akademie der Wissenschaften, Wien.
La Société des Arts et des Sciences à Batavia.
Naturforschende Gesellschaft in Emden.
Auftrag des Aerztlichen Vereins in Frankfurt.

July.—Royal Dublin Society;
Royal Society of Edinburgh;
Yale College, New Haven; severally acknowledging receipt of publications.
Literary and Philosophical Society of Liverpool, with Proceedings and soliciting publications of Academy in return.
Leiden Astronomical Observatory, with Proceedings of the Observatory.
Legacáo do Brazil, with copy of Mr. Emm Liais' work "Climats Geologie, Faune et Geographie botanique du Bresil."
Buffalo Society of Natural Sciences, Buffalo, notifying the Academy of papers by A. R. Grote and Chas. H. Peck.
Academie Royale des Sciences à Amsterdam.
Die Naturforschende Gesellschaft in Freiburg.
Der Naturforscher-Verein zu Riga.
Société Royale des Science et des Lettres de Throndhjem.
G. W. Fairman, with copy of resolutions.
Die Königlich Sächsische Gesellschaft der Wissenschaften, Leipzig.
Deutsche Geologische Gesellschaft, in Berlin.
Université Catholique de Louvain.
L'Académie Royale des Sciences de Lisbonne.

August.—Magyar Tudomanyos Akademia, acknowledging receipt of Proceedings.
G. Schneider, with Catalogue of Bird Skins.

September.—Dr. W. C. Puxty, wishing to become a correspondent.
Ferdinandeums, Insbruck.

October.—Lyceum of Natural History, N. Y.;
Geological Society of London; severally acknowledging receipt of publications.
Edward Price, soliciting name of specimen.
Geological Survey of India, Calcutta, with memoirs, and soliciting the Academy's publications.
Société d'Agriculture de Lyon.
Societa di Letture, Genova.
Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique, Bruxelles.

Verein für Vaterländische Naturkunde in Württemberg.
Société Linnéenne de Lyon.

November.—T. G. Smith, with resignation.
Academy of Arts and Sciences, Boston;
Lyceum of Natural History, N. Y.;
Library of Congress;
Essex Institute, Salem; severally acknowledging receipt of publications.
A. Garrett, acknowledging receipt of notice of election as correspondent.
Magyar Tudomanyos Akademia, Pest, with publications.
Auftrag des Aerztlichen Vereins in Frankfurt;
Die Naturforschende Gesellschaft in Bern;
Naturforschende Gesellschaft in Halle;
Schweizerische Gesellschaft in Bern;
Herbier Royale à Leide;
Schweizerische Naturforschende Gesellschaft, Bern;
Det Kongelige Danske Videnskabernes Selskab, Kjobenhavn;
Die Königl. Böhmische Gesellschaft der Wissenschaften, Prag;
Société Royale Hongroise des Sciences Naturelles, Pest; all accompanying publications.

December.—American Geographical Society, N. Y.;
Smithsonian Institution, Washington, D. C.; severally acknowledging receipt of publications.

Capt. J. Herschel, R. E., soliciting Sir J. F. W. Herschel's Letters.
Dr. Heck, with list of special collections.
La Société des Arts et des Sciences à Batavia.
Die Senkenbergische Naturforschende Gesellschaft, Frankfurt.
R. S. Henwood, with specimens.
Bureau of Education, Washington, D. C., soliciting catalogue.
Bibliothek der Schlessischen Gesellschaft für Vaterländische Cultur.

Which is respectfully submitted,

EDWARD D. COPE,
Corresponding Secretary.

DONATIONS TO THE LIBRARY, 1873.

JOURNALS AND PERIODICALS.

NORWAY.

Christiania. Forhandlinger i Videnskabs Selskabet i Christiania. Aar 1871. From the Society.

Forhandlinger ved de Skandinaviske Naturforskeres, i Christiania fra den 4de tilden, 10de July, 1868. From the Society.

Nyt Magazin for Naturvidenskaberne. Udgivet af den physiographiske Forening i Christiania. 1872, 19er Binds, 1st og 2det Heft. From the Society.

Throndhjem. Det Kongelige Norske Videnskabernes Selskabs Skrifter. 19de Aarhundrede, 1872. From the Society.

DENMARK.

Copenhagen. Mémoires de la Société Royale des Antiquaires du Nord. Nouvelle Série, 1872. From the Society.

Tillaeg til Aarboger for Nordisk Oldkyndighed og Historie, Aargang 1872. Published by the same. From the Society.

Mémoire de l'Academie Royale de Copenhague. 5me Série. Classe des Sciences. Vol. IX., Nos. 8 and 9; Vol. X., Nos. 1 and 2. 1872. From the Society.

Videnskabernes Selskab Skrifter, 5 Række, IX. Bd. 6 and 7, 1872. From the Society.

Oversigt over det K. Danske Videnskabernes Selskabs Forhandlinger og dets Medlemmers Arbeider. Aaret, 1871; No. 3, 1872. From the Society.

RUSSIA.

Moscow. Bulletin de la Société Impériale des Naturalistes de Moscou. Année, 1872, No. 2, to 1873, No. 1. From the Society.

Riga. Correspondenzblatt des Naturforscher-Vereins zu Riga, 19er Jahrg. From the Society.

St. Petersburg. Bulletin de l'Académie Imperiale des Sciences de St. Petersburg. Tome 18, Nos. 1–5 et dernier.

Memoirs of the same. Tome 18, No. 8, to Tome 19, No. 7. From the Society.

HOLLAND.

Amsterdam. Verslagen en Mededeelingen der K. Akademie van Wetenshappen. Afdeeling Letterkunde, Tweede Reeks, Tweede Deel. Afdeeling Natuurkunde, Tweede Reeks, Zesde Deel, 1872.

Jaarbock of the same, 1871.

Processen Verball of the same, 1871–72.

Verhandelingen of the same. Afdeeling Letterkunde, Zevende Deel. With Atlas, 1872. From the Society.

Haag. Annalen der Sternwarte in Leiden, 3er Band, 1872. From the Observatory.

GERMANY.

Berlin. Archiv für Naturgeschichte. 37er Jahrg, 5es Heft, to 39er Jahrg. 2es Heft, 1873. From the Editor.

Berliner Entomologische Zeitschrift. Herausgegeben von dem Entomologischen Vereine in Berlin. 16er Jahrg, 2es—4es Vierteljahrsheft, 1872. From the Society.

Monatsbericht der K. P. Akademie der Wissenshaften zu Berlin, Aug. 1872–Aug. 1873. From the Society.

Mathematische und Physikalische Abhandlungen der K. Akademie der Wissenschaften zu Berlin. Aus dem Jahre., 1873. From the Society.

Sitzungs-Berichte der Gesellschaft Naturforschender Freunde zu Berlin im Jahre 1872. From the Society.

Zeitschrift für die Gesammten Naturwissenschaften. Neue Folge., 1872; Band V. and VI. From the Editor.

Zeitschrift der deutschen geologischen Gesellschaft. XXIV. Band, 2 Heft, XXV. Band, 2 Heft. From the Society.

Wochenschrift des Vereins zur Beförderung des Gartenbaues in den K. P. Staaten für Gärtnerei und Pflanzenkunde. Nos. 1–52, 1872. From the Society.

Braunschweig. Archiv für Anthropologie, 5er Band, 4es; 6er Band, 2es Vierteljahrsheft, 1872. Purchased.

Bremen. XVI. Jahres-Bericht des Schwedischen Heilgymnastischen Institutes in Bremen, 1873. From the Society.

Abhandlungen herausgegeben von der Naturwissenschaftlichen Verein zu Bremen. III. Band, III. Heft, 1873. From the Society.

Brünn. Verhandlungen des Naturforschenden Vereins in Brünn, X. Band, 1871. From the Society.

Cassel. Malakozoologische Blätter. Bd. 20, pages 49 *et seq.* Purchased.

Danzig. Schriften der naturforchenden Gesellschaft in Danzig. Neue Folge, 3er Bandes, 1es Heft, 1872. From the Society.

Dresden. Sitzungsberichte der naturwissenschaftlichen Gesellschaft Isis in Dresden, 1872, April—1873, March. From the Society.

Emden. 27er Jahresbericht der Naturforschenden Gesellschaft in Emden, 1871. From the Society.

Kleine Schriften der Naturforschenden Gesellschraft zu Emden, XVI., 1872. From the Society.

Erlangen. Sitzungsberichte der physicalisch-medicinischen Societat zu Erlangen. 4 Heft. From the Society.

Frankfurt, A. M. Bericht über die Senckenbergische naturforschende Gesellschaft, 1871–72. From the Society.

Abhandlungen herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft. 8er Bandes, 3 and 4 Heft, 1872. From the Society.

Jahresbericht uber die Verwaltung des Medicinalwesens die Krankenanstalten und die Oeffentlichen Gesundheitsverhaeltnisse der Stadt Frankfurt, A. M. Herausgegeben von dem Aerztlichen Verein. XIV. —XVI. Jahrg. 1872. From the Society.

Jaresbericht des Frankfurter Vereins für Geographie und Statistik. 35er and 36er Jahrg. 1871. From the Society.

Der Zoologische Garten. 13 Jahrg. 1872, No. 7–1873, No. 6. From the Editor.

Nachrichtsblatt der deutschen Malakozoologischen Gesellschaft. 4er Jahrg., No. 1–6, 1872. Purchased.

Frauenfeld. Verhandlungen der Schweizerischen Naturforschenden Gesellschaft in Frauenfeld, Jahresversammlung. Jahresbericht, 1871. From the Society.

Freiburg. Berichte über die Verhandlungen der Naturforschenden Gesellschaft zu Freiburg I. B. Band VI., Heft 1, 1873. From the Society.

Actes de la Société Helvetique des Sciences Naturales. 55me Session. Compte-Rendu, 1872. 1873. From the Society.

Giessen. Vierzehnter Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde, 1873. From the Society.

Göttingen. Nachrichten von der K. Gesellschaft der Wissenschaften und der Georg-Augusts Universität aus dem Jahre 1873. From the Society.

Halle. Abhandlungen der Naturforschenden Gesellschaft zu Halle. 12er Bandes, 3es and 4es Heft, 1873. From the Society.

Hamburg. Abhandlungen aus dem Gebiete der Naturwissenschaftlichen Verein in Hamburg. V. Band, 2 and 3 Abth. From the Society.

Hannover. Zweiundzwanzigster Jahresbericht der Naturhistorischen Gesellschaft zu Hannover. From the Society.

Heidelberg. Verhandlungen der naturhistorisch-medicinischen Vereins zu Heidelberg. 6er Band. 1871–72. From the Society.

Innsbruck. Zeitschrift des Ferdinandium für Tirol und Vorælberg, 3e Folge, 17es Heft. From the Society.

Konigsberg. Schriften der Königlichen Physikalisch-Ökonomischen Gesellschaft. zu Konigsberg, 12er Jahrg. 1871; 1er Abth; 13er Jahrg. 1872. 2e Abth. From the Society.

Leipzig. Archiv für Anatomie Physiologie und Wissenschaftliche Medicin. Herausgegeben von Drs. Reichert und Du Bois-Reymond, Jahrg. 1872, Heft III.–1873. Heft I. Purchased.

Berichte uber die Verhandlungen der K. S. Gesellschaft der Wissenschaften zu Leipzig. Mathematisch Physische Classe, 1871–IV.–VII.; 1872, I.–II., 1872.

Abhandlungen of the same. Band X., Nos. III.–V., 1872. From the Society.

Jahrbuch für wissenschaftliche Botanik. Herausgegeben von Dr. N. Pringsheim, 8er Band, 4es Heft, und 9er Band, 1es Heft. Purchased.

Journal für Ornithologie, 20 Jahrg., Heft V.–21 Jahrg., Heft III. Purchased.

Zeitschrift für wissenschaftliche Zoologie herausgegeben von C. T. v. Siebold und Albert Kölliker, 23er Band, 1es and 2es Heft, 1873. Purchased.

Luxembourg. Publication de l'Institute Royal de Grand Duche de Luxembourg. Tome XIII. 1873. From the Society.

Marburg. Sitzungsberichte der Gesellschaft zür Beförderung der gesammten Naturwissenschaften in Marburg. Jahrg., 1869 and 1871.

Schriften of the same, 9er and 10er Band. 1872. From the Society.

Mecklenburg. Archiv des Vereins der Freunde der Naturgeschrichte in Mecklenburg, 26 Jahr.; Neubrandenburg, 1873. From the Society.

München. Abhandlungen der Mathematisch-physikalischen Class der K. B. Akademie der Wissenschaften, 11en Bandes, 1es Abth. Philosophisch-philologischen Classe, 12en Bandes, 2e and 3e Abth., 1871. From the Society.

Sitzungsberichte der Mathematisch-physikalischen Classe der K. B. Akademie der Wissenschaften zu München. 1871, Heft. III., 1872, Heft. I. and II. Inhaltverzeichniss zu Jahrg. 1860–1870, of the same. From the Society.

XII. Supplementband zu den Annalen der München Sternwarte, 1872. From the Observatory.

Nurnberg. Abhandlungen der Naturhistorischen Gesellschaft zu Nurnberg V. Band., 1872. From the Society.

Pest. A Magyar Tudomanyos Akadémia Értesítője. Otodik Evfolyam 10 Szam., Hatodik Evfolyam 8 Szam. From the Society.

Ertekezesek a Mathematikai Tudomanyok Korebol. Kiadja a Magyar Tudomanyok Akadémia. VIII. Szam, 1871. II. Kötet, 1 Szam, 1872.

Termeszettudomanyok Korebel. IX Szam., 1871. III. Kötet. III. Szam, 1872. 71–72. From the Society.

Természettudomanyi Közlöny. IV. Kötet, Jan. Dec. 1872. From the Hungarian Academy.

A. M. T. Akadémia Erkönyvei. Tizenharmodik Kötet. III. Darab. Pesten, 1872. From the Society.

M. Tudom. Akadémia Almanach, 1872. Pesten, 1872. From the Society.

Prag. Sitzungsberichte der K. B. Gesellschaft der Wissenschaften in Prag. Jahrg. 1871 and Jahrg. 1872 Jan.–July. From the Society.

Abhandlungen der K. B. Gesellschaft der Wissenschaften von Jahre 1871–72. Sechste Folge, 5er Band. Prag, 1872. From the Society.

Regensburg. Flora oder allgemeine botanische Zeitung, herausgegeben von der K. B. botan. Gesellschaft in Regensburg. Neue Reihe, 30 Jahrg. 1872. From the Society.

Correspondenz-Blatt des Zoologisch-Mineralogischen Vereins in Regensburg, 26er Jahrg., 1872. From the Society.

Stettin. Entomologische Zeitung. Herausgegeben von dem entomologische Vereins zu Stettin, 30er Jahrg., 1872. From the Society.

Stuttgart. Neues Jahrbuch für Mineralogie, Geologie und Palæontologie, Jahrg. 1872, 4es—1873, 3es Heft. From the Editor.

Württembergische naturwissenschaftliche Jahreshefte, 28er Jahrg. 1—29er Jahrg. 3es Heft. From the Society.

Wiesbaden. Jahrbucher des Nassauischen Vereins für Naturkunde. Jahrg. XXV, and XXVI., 1871 and 1872. From the Society.

Wurzburg. Verhandlungen der Physical.-Medicinische Gesellschaft. III. Band, 3 Heft.—IV. Band, 1 Heft. From the Society.

Vienna. Verhandlungen der K. K. Geologischen Reichsanstalt, 1872, No. 11—1873, No. 6. From the Society.

Abhandlungen of the same, Band V., Heft 4.

Jahrbuch of the same. Jahrg. 1872, No. 3–1873, No. 1. From the Society.

General Register der Bande XI.–XX. der Jahrbuches und der Jahrgänge, 1840–70, der Verhandlungen der K. K. Geologischen Reichsanstalt, 1872. From the Society.

Zeitschrift der K. Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. LXX. Band, 1–3 Abtheil, 1872. From the Society.

Register zu den bänden 61 bis 64 der Sitzungsbericht, VII., 1872. From the Society.

Denkschriften der K. Akademie der Wissenschaften. Mathem.-Naturw. Classe, 32er Band, 1872. From the Society.

Verhandlungen der K. K. Zoologische botanischen Gesellschaft in Wein. Jahrg. 1872. XXII. Band, 1872. From the Society.

SWITZERLAND.

Basel. Verhandlungen der Naturforschenden Gesellschaft in Basel. 5er Theil, 4es Heft, 1873. From the Editor.

Bern. Mittheilungen der naturforschen Gesellschaft in Bern aus dem Jahren 1871–1872. From the Society.

Genève. Bulletin de l'Institute National Genevois. No. 36, Vol. XVII. Pages 1–216, 1872. From the Society.

Mémoires de la Société de Physique et d'Histoire Naturelle de Genève. Tome XXI., 2e Partie. Tome XXII. From the Society.

Lausanne. Bulletin de la Société Vaudoise des Sciences Naturelles, 2e Série. Vols XI. and XII. From the Society.

Neufchatel. Bulletin de la Société des Sciences Naturelles de Neufchatel. Tome IX., 2e Cahier, 1872. From the Society.

St. Gallen. Bericht über die Thätigkeit der St. Gallischen naturwissenschaftlichen Gesellschaft während des Vereinsjahres, 1871–72. 1873. From the Society.

Zurich. Vierteljahrsschrift der Naturforschenden Gesellschaft in Zurich. 16er Band, 1871. From the Society.

BELGIUM.

Bruxelles. Annuaire de l'Académie Royale des Sciences, des Lettres, et des Beaux-Arts de Belgique, 38e and 39e Année, 1872–73.

Bulletins of the same, 2me Série. Tomes 32, 33, and 34, 1871–72.

Mémoires Couronnes of the same. 8vo., Tome 22, 1872. From the Society.

Memoirs of the same.

Centième Anniversaire de Fondation of the same, 1772–1872. Tomes 1 and 2, 1872. From the Society.

Société Malacologique de Belgique, Procès-Verbal. P. P. 83 et seq. Tome I. 1872. From the Society.

Annales de la Société Entomologique de Belgique. Tomes 14me–15me. From the Society.

Liége. Mémoires de la Société Royale des Sciences de Liége. 2me Série. Tome III., 1873. From the Society.

Louvain. Annuaire de l'Université Catholique de Louvain, 1837, 1871–1873. From the Society.

Mons. Mémoires et Publications de la Société des Sciences, des Arts et des Lettres du Hainaut. III. Série. Tomes 6me–8me. From the Society.

FRANCE.

Angers. Mémoirs de la Société Nationale d'Agriculture, Science et Arts d'Angers (Nouvelle Periode). Tome Quinzième, 1872. Nos. 2–4, 1872. From the Society.

Auxerre. Bulletin de la Société des Sciences Historiques et Naturelles de l'Yonne, Année 1872. 26e Vol., 1873. From the Society.

Bordeaux. Mémoire de la Société des Sciences Physiques et Naturelles de Bordeaux. Tomes VIII., IX. From the Society.

Caen. Mémoirs de l'Académie Nationale des Sciences, Arts et Belles-Lettres de Caen. From the Society.

Lille. Mémoirs de la Société des Sciences, de l'Agriculture et des Arts de Lille, Année, 1872. IIIe Série, 10e Vol., 1873. From the Society.

Lyon. Annales de la Société Linnéenne de Lyon, Années 1870–72. Nouvelle Série. Tomes 18me et 19me. From the Society.

Annales de la Société d'Agriculture, Histoire Naturelle et Arts Utiles de Lyon. 4me Série. Tomes 2me et 3me. From the Society.

Mémoires de l'Académie des Sciences, Belles-Lettres et Arts de Lyon. Classe des Sciences. Tomes 18me et 19me, 1870–71. From the Society.

Orleans. Mémoires de la Société d'Agriculture, Sciences, Belles-Lettres et Arts d'Orleans. Tome XIV., No. 4, to Tome XV., No. 2. From the Society.

Paris. Archives de Zoologie Expérimentale et générale. Tome 1 and Tome 2, Nos. 1 and 2. Purchased.

Actes de l'Académie Nationale des Sciences, Belles-Lettres et Arts de Bordeaux. 3e Serie. 33e Année, 1871–72. From the Society.

Annales de la Société Entomologique de France. 4me. Série. Tome 10me. Partie Supplementaire, 5me Série. Tome 2me, 1872. From the Society.

Annales des Mines. 7me Série. Tome III., 3me Livr, 1873. Table des Matieres, 1862–1871. From the Minister of the Public Works, France.

Annales des Sciences Naturelles. 5me Série. Zoologie, Tome XVII., No. 1, to Tome XVIII., No. 6. Botanique Tome XV., Nos. 1–6. Tome XVI., No. 1, to Tome XVIII., No. 3, 1872. Purchased.

Bulletin mensuel de la Société d'Acclimatation. 2me Série. Tome IX., No. 8, to Tome X., No. 9. From the Society.

Bulletin de la Société Botanique de France. Tome 18me, 1871. Comptes rendus des Séances 4, 1872, 1–4, Revue Bibliographique A. E. From the Society.

Bulletin des Séances de la Société Centrale d'Agriculture de France. 3me Série. Tomes III.–VII., 1858–72. From the Society.

Journal de Conchyliologie. 3e Série. Tome XII., No. 4, to Tome 13, No. 4, 1872–3. From the Editor.

Journal de Zoologie. Par M. Paul Gervais. Tome 1me, No. 5, to Tome 2me, No. 4. Purchased.

Revue Scientifique de la France et de l'Etranger, Nos. 22–52. From the Editor.

Toulouse. Mémoires de l'Académie des Sciences, Inscriptions et Belles-Lettres de Toulouse. 7me Série. Tome IV., 1872. From the Society.

PORTUGAL.

Lisbon. Historia e Memorias da Academia Real das Sciences de Lisboa. Classe de Sciences Moraes, Politicas e Bellas-Lettras Nova Serie. Tomes I. Tome II., Part II. Tome III., Part I. Classe de Sciencias Mathematicas, Physicas e Naturaes Tomes 1 and 2. Tome 3, Part I. Tome 4, 1855–1871. From the Society.

Journal de Sciencias Mathematicas, Physicas e Naturaes publicado os auspicios da Academia Real das Sciencias de Lisboa. Tomes 1–3, and Nos. 11–15, 1869–73. From the Society.

ITALY.

Bologna. Rendiconto delle Sessioni dell'Accademia delle Scienze dell' Istituto di Bologna. Anno. Accademico, 1871–72. From the Society.

Memorie of the same. Serie III. Tome I., No. 2, to Tome II., No. 2, 1872. From the Society.

Firenze. Atti della Reale Accademia economico agraria dei Georgofili di Firenze. 4ta Serie, Vol. 1, Disp. 2; Vol. 2, Disp. 2, 1872. From the Society.

Lucca. Atti della Reale Accademia Lucchese di Scienze, Lettere ed Arti. Tome 19, 1873. From the Society.

Milano. Memoirs Reale Istituto Lombardo de Scienze e Lettere. Vol XII. Fasc. 3–5, 1871–72. From the Society.

Reale Istituto Lombardo di Scienze e Lettere. Rendiconti. Série II. From Vol. IV. Fasc. 14 to Vol. VI. Fasc. V. 1871–73. From the Society.

Atti della Fondazione Scientifica Cagnola. Vol. V., Part 3, 1871. From the Society.

Napoli. Atti del Reale Istituto d'Incoraggiamento alle Scienze. 2a Série. Tome VIII., Part 1. From the Society.

Lorino. Cosmos di Guido Cora. II., 1873. From the Society.

Venezia. Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti. From Serie Terza. Tome 14, Disp. 7me, to Serie Quarto Tomo 2, Disp. 5, 1868–1872. From the Society.

GREAT BRITAIN AND IRELAND.

Belfast. Proceedings of the Belfast Natural History and Philosophical Society. Session 1871–72. From the Society.

Sixth, Eight, Ninth, and Tenth Annual Reports of the Belfast Naturalists' Field Club, 1868–69, 1870–71, 1871–72. From the Society.

Dublin. The Journal of the Royal Dublin Society, Vol. VI., No. II., 1872. From the Society.

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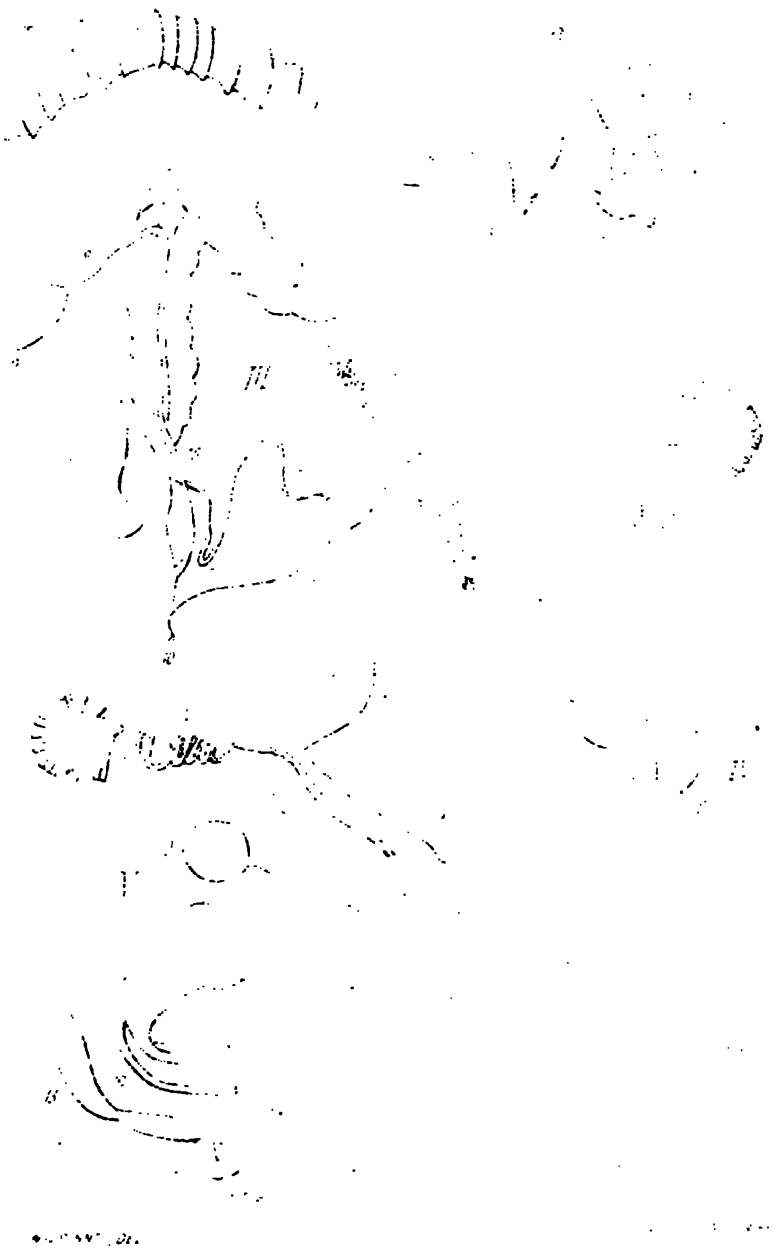

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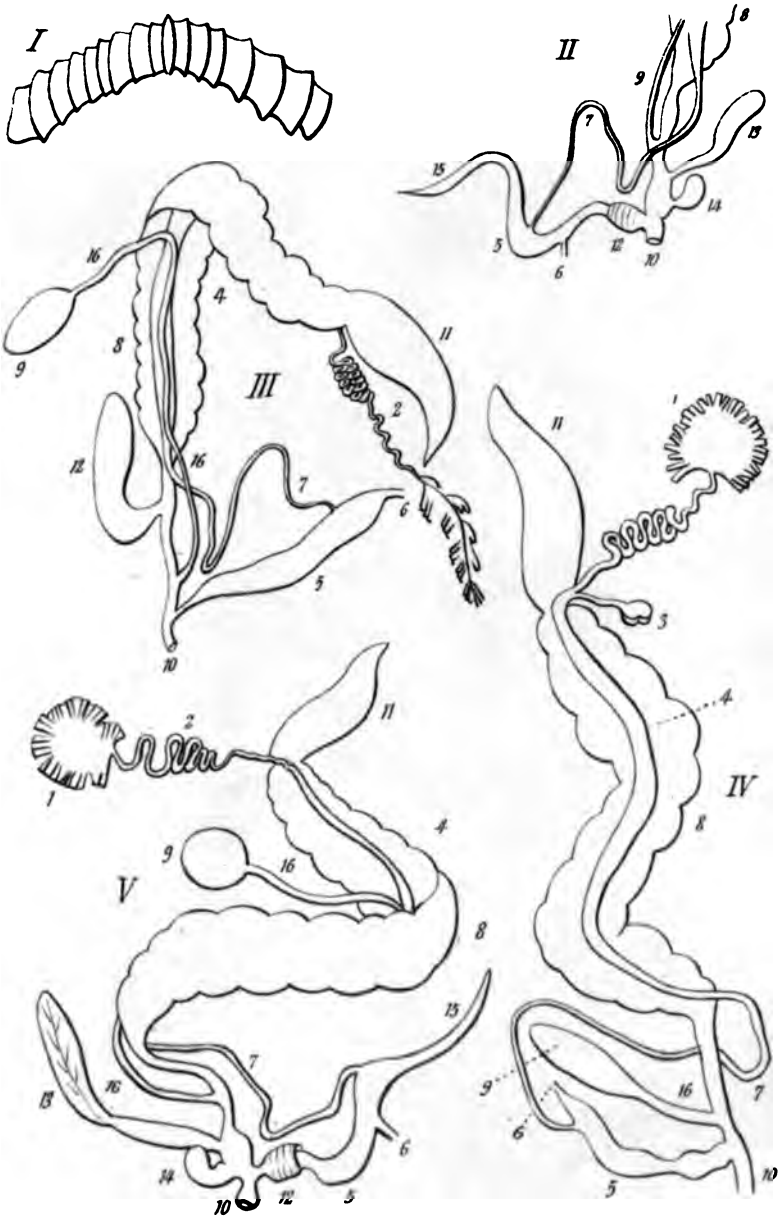

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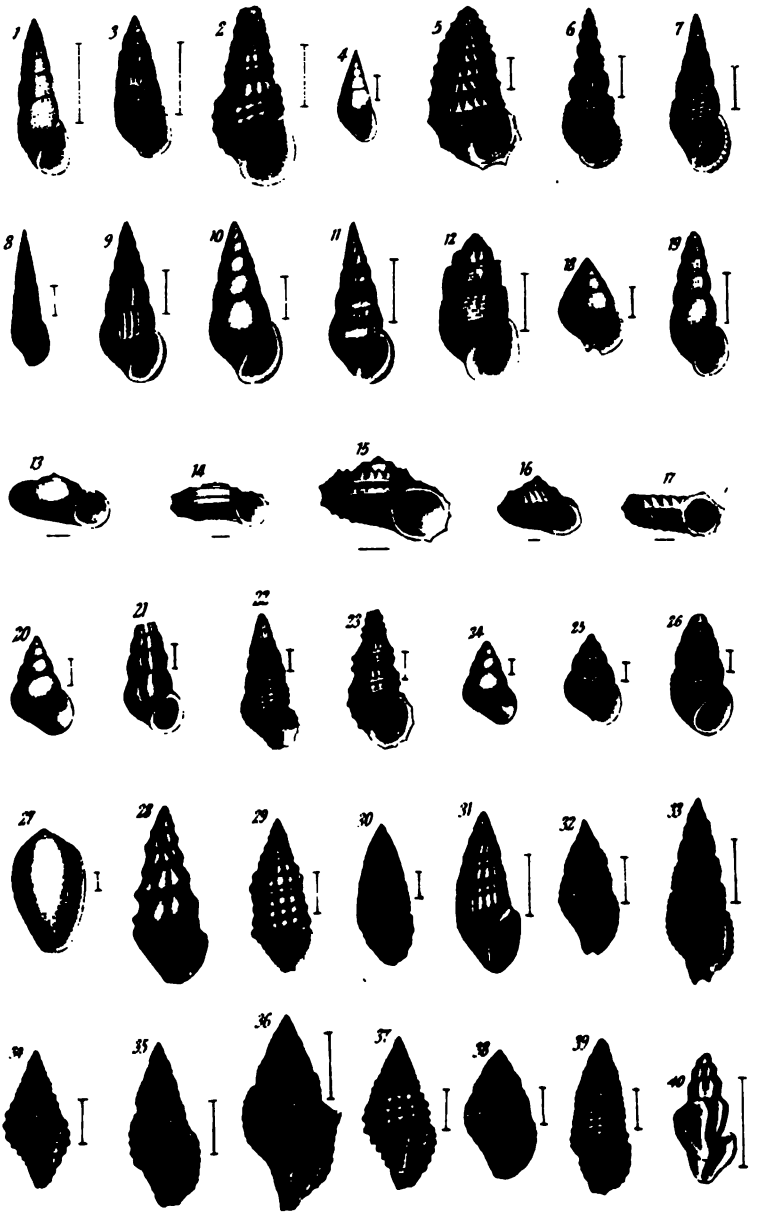

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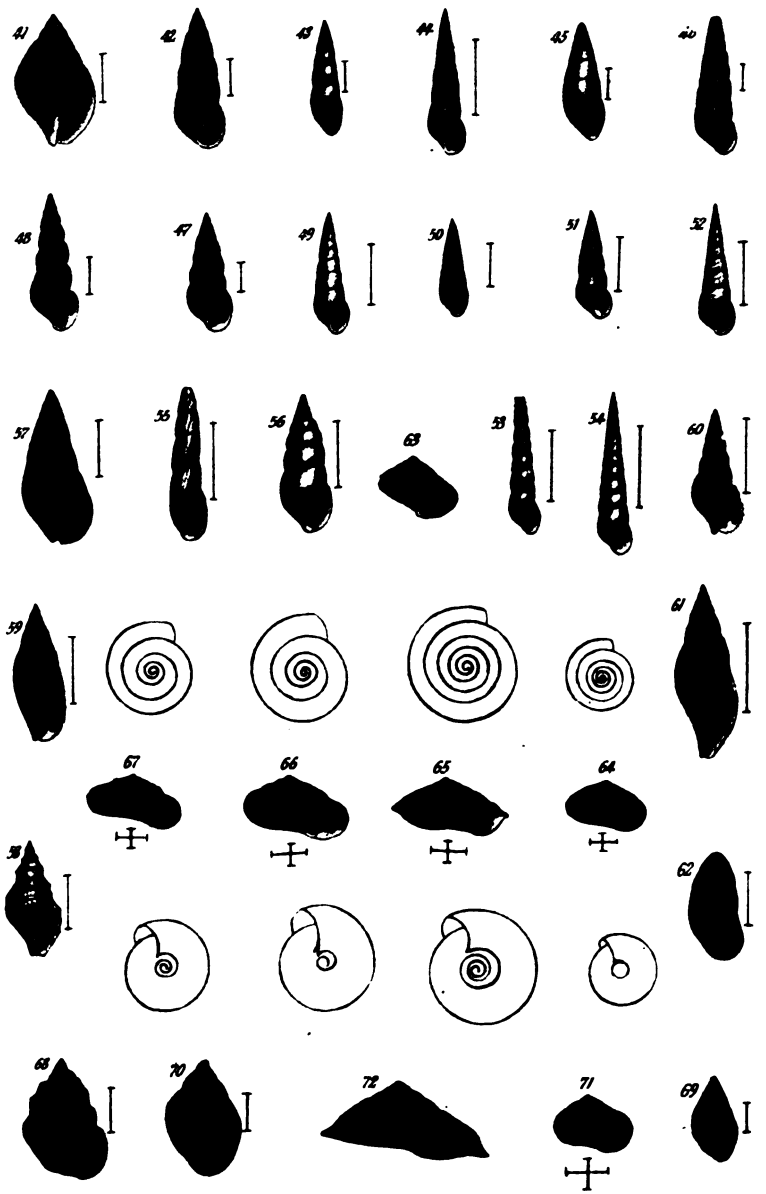

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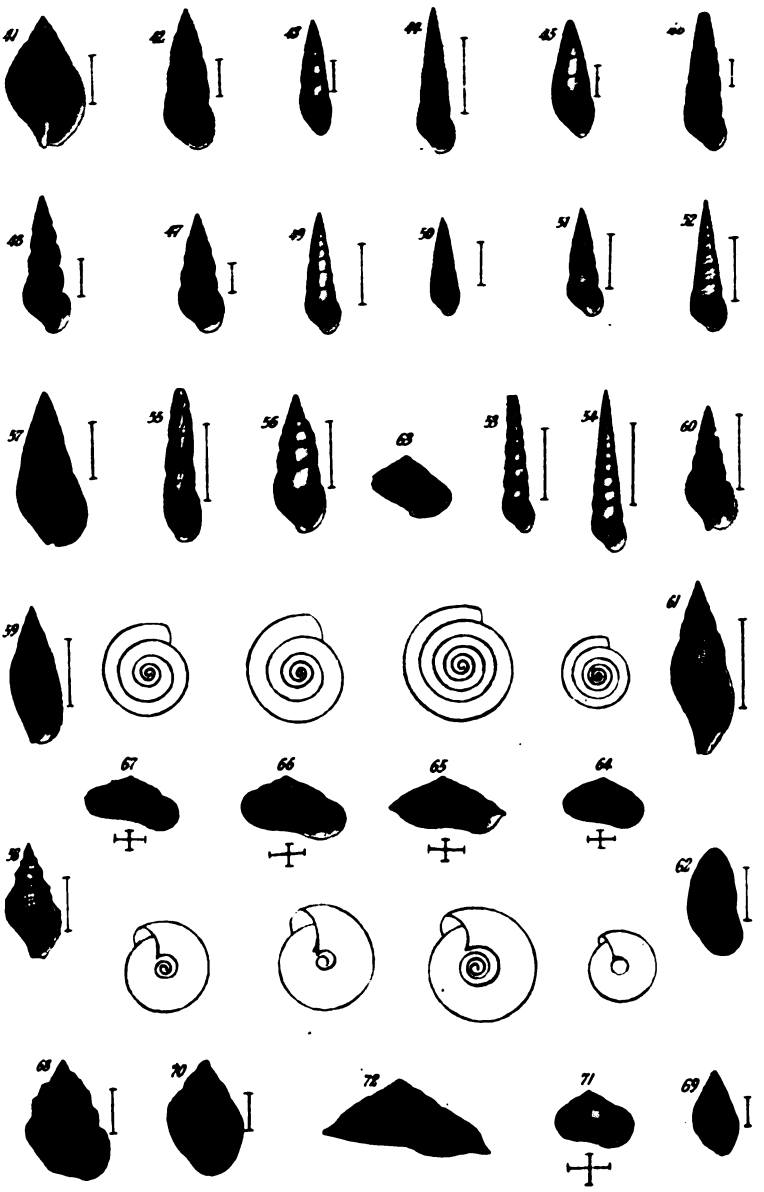

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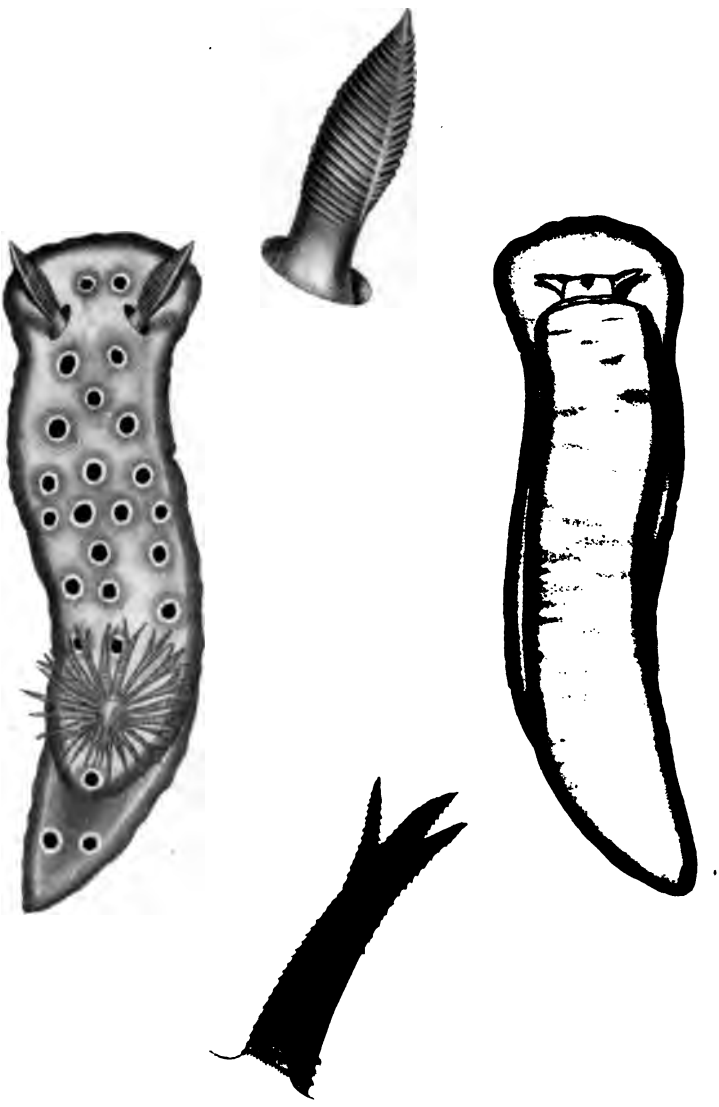

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